S. Hrg. 102-25, Pt. 2

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEARS 1992 AND 1993

HEARINGS

BEFORE THE

COMMITTEE ON ARMED SERVICES
UNITED STATES SENATE

ONE HUNDRED SECOND CONGRESS

FIRST SESSION

ON

S. 1507

AUTHORIZING APPROPRIATIONS FOR FISCAL YEARS 1992 AND 1993 FOR MILITARY ACTIVITIES OF THE DEPARTMENT OF DEFENSE, FOR MILITARY CONSTRUCTION, AND FOR DEFENSE ACTIVITIES OF THE DEPARTMENT OF ENERGY, TO PRESCRIBE PERSONNEL STRENGTHS FOR SUCH FISCAL YEARS FOR THE ARMED FORCES, AND FOR OTHER PURPOSES

PART 2

PRODUCTION FORCES AND REGIONAL DEFENSE

MAY 6, 7, 13, 14, 15, 16, 1991

Printed for the use of the Committee on Armed Services

U.S. GOVERNMENT PRINTING OFFICE

WASHINGTON : 1991

S 201-30

CONTENTS

CHRONOLOGICAL LIST OF WITNESSES

U.S. Marine Corps Capabilities

MAY 10, 1991

	Page
Gray, Gen. A.M., Commandant, U.S. Marine Corps	4

Strategic Strategies, Lift Capability and Programs

MAY 24, 1991

Johnson, Gen. Hansford T., U.S. Air Force, Commander in Chief, U.S. Transportation Command	37
Luttrell, Vice Adm. Stephen F., U.S. Navy, Deputy Chief of Naval Operations (Logistics)	46
Lehrack, Capt. Warren H., Administrator, Maritime Administration, U.S. Department of Transportation	51

Antisubmarine Warfare Programs and Attack Submarine Programs

JUNE 7, 1991

Cann, Hon. Gerald A., Assistant Secretary of the Navy, Research, Development and Acquisition	90
Williams, Vice Adm. James D., USN, Deputy Chief of Naval Operations, Naval Warfare	98
Jones, Rear Adm. Raymond G., USN, Deputy Assistant Chief of Naval Operations, Undersea Warfare	101

Naval Forces Issues

JUNE 11, 1991

Hale, Robert F., Assistant Director, National Security Division, Congressional Budget Office, accompanied by Lane Pierrot, Principal Analyst, National Security Division, Congressional Budget Office, and Michael B. Berger, Navy Analyst, National Security Division, Congressional Budget Office	143
Garrett, Hon. H. Lawrence III, Secretary of the Navy	171
Kelso, Adm. Frank B. II, Chief of Naval Operations	180

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEARS 1992 AND 1993

FRIDAY, MAY 17, 1991

U.S. SENATE,
SUBCOMMITTEE ON PROJECTION FORCES
AND REGIONAL DEFENSE,
COMMITTEE ON ARMED FORCES,
Washington, DC.

U.S. MARINE CORPS CAPABILITIES

The subcommittee met, pursuant to notice, at 10:05 a.m., Senator Edward M. Kennedy (chairman of the subcommittee) presiding.

Committee members present: Senators Kennedy, Dixon, Cohen, and McCain.

Committee staff members present: Daniel G. Sakura, research assistant.

Professional staff members present: Creighton Greene.

Minority staff members present: Romie L. Brownlee, deputy staff director; Durwood W. Ringo, Jr. and Mark B. Robinson, professional staff members.

Staff assistants present: Barbara L. Braucht and Julie W. Kemp.

Committee members' assistants present: William J. Lynn, assistant to Senator Kennedy; Charles C. Smith, assistant to Senator Dixon; Anthony H. Cordesman, assistant to Senator McCain; Samuel D. Adcock, assistant to Senator Lott; Thomas L. Lankford, assistant to Senator Smith.

OPENING STATEMENT OF SENATOR EDWARD M. KENNEDY, CHAIRMAN

Senator KENNEDY. The meeting will come to order. I want to welcome Gen. Alfred Gray, Commandant of the U.S. Marine Corps, here this morning.

The subcommittee meets today to hear testimony on the issues facing the Marine Corps in this year's Defense budget, as well as the role of the Marines in Operations Desert Shield and Desert Storm and in the humanitarian operations in Kurdistan and Bangladesh.

Not since World War II have we experienced such dramatic changes as in the past 2 years, with the fall of the Berlin Wall in November 1989, signaling the breakup of the Soviet empire and a dramatic reduction in East/West tensions.

There was little time to celebrate. Saddam Hussein's invasion of Kuwait provided a historical reminder that the world remains a dangerous place, and the Nation must be ready to defend its vital interests.

The end of the Warsaw Pact has reduced the nuclear threat to the United States and the military threat to NATO, allowing substantial reductions in our defense budget. We must be careful to make cuts in the right areas, while protecting those forces still needed to beat the regional defense threats.

In this post-cold war world, the Marine Corps has a vital role. To defend our interests we need to be able to project our military power to most regions of the world. The Marines have proved repeatedly that they excel at this job.

In the days immediately after Iraq's invasion of Kuwait, the Marines, using their prepositioned equipment, became the first heavy ground units to reach Saudi Arabia. Within 2 weeks of the invasion, a full Marine expeditionary brigade took up defense positions on the Saudi/Kuwait border.

This quick response may well have been the key to preventing Saddam Hussein from continuing his aggression and invading Saudi Arabia. President Bush deserves high marks for that critical decision to intervene and so do the Marines for carrying it out.

During Operation Desert Storm, two Marine divisions helped liberate Kuwait while a Marine brigade offshore froze six Iraqi divisions on the Kuwait coast with a threat of an amphibious landing.

Less well-known, but equally impressive, are the Marines' contributions in other recent crises. During the civil war in Liberia last fall, a Marine amphibious group rescued over 2,000 Americans and other civilians threatened by the fighting, not a single life was lost in this dangerous operation.

In January, Marine units rescued members of the American Embassy trapped by the fighting in Somalia; again, without the loss of any lives.

As we meet today, Marine units are actively participating in two major humanitarian efforts: Operation Provide Comfort, to aid the Kurdish refugees on the Iraqi borders, and Operation Productive Effort to help those affected by the cyclones in Bangladesh. I hope we can hear more about these two operations today.

This will be General Gray's last appearance before the subcommittee as Commandant. General, I know I speak for the entire committee in commending you for your outstanding service.

General Gray is the quintessential Marine, who began his career as an enlisted man during the Korean war. In the 40 years since then he has risen through the ranks to the position of Commandant.

In recent years, it has been my privilege and a privilege for all of us on the committee to work with him to maintain and strengthen the Marine Corps and do so within the existing budget limits.

In that time, we have greatly benefited from General Gray's wisdom and, impressed by his leadership, will miss his counsel and his friendship in the years ahead.

General, I just want to add my own personal appreciation for all of the various kindnesses that you have extended me and for the very significant help and assistance that you have provided to me

to better understand not only the role of the Marines, but also to better understand the various tactical and strategic global challenges that we face for the vital interests for the security of this Nation.

I think you have been, as all of us know, an extraordinary spokesman for all of the Marines, but I think perhaps what is not as well-known is the great impact that you have had in terms of the fashioning and shaping of tactical and strategic policy. I think all of us very much appreciate this extraordinary service to the country.

It has been a public service of extraordinary dimension, and we are going to miss you.

At this time I would like for Senator Dixon's prepared statement be inserted into the record.

[The prepared statement of Senator Dixon follows:]

PREPARED STATEMENT BY SENATOR ALAN J. DIXON

Mr. Chairman, it is a pleasure to have with us today the distinguished Commandant of the U.S. Marine Corps, General A.M. Gray.

I look forward to hearing from General Gray on the readiness and capabilities of the U.S. Marine Corps, especially in view of the recent dramatic changes in the world and in our national security environment.

I am particularly interested to hear about the Marine Corps force structure, especially as we draw down the force. I want to ensure there is enough emphasis on readiness, sustainability and support. We must make sure we do not end up with a hollow force.

I am also very interested to hear about our ability to move our Marine Corps on short notice over long distances in a hostile environment.

I look forward to the testimony of our distinguished guest.

Thank you, Mr. Chairman.

Senator KENNEDY. Senator Cohen.

Senator COHEN. Thank you, Mr. Chairman.

Let me join in the Chairman's remarks, General Gray. This is your final hearing before the subcommittee and as such, I wish we had a wider acknowledgement of the importance of your contribution to the Marine Corps, the things that you have done and the legacy you will leave.

One of the most important aspects of your legacy is the improved readiness that you brought to the Marine Corps. You have emphasized, at virtually every level, greater and more intensive training, and we can see the results of that training in some of the operations that Senator Kennedy mentioned just a moment ago.

Second, I think another one of the more important legacies you will leave is the emphasis upon education. Your reading list; I think it is somewhat deficient, I might say, because I do not think any of my books ever made it to that list, but there is still hope for improvement as you leave the Marine Corps and go into other endeavors; I am sure that my works will find their way on your bookshelf.

I might even write one called, "One-Eyed Generals," but I would specifically omit you from that novel because you are, above all things, a very clear-eyed visionary individual who has never stumbled into the land of the blind.

And, you have initiated the establishment of the Marine University at Quantico which is going to be a top-level school for the Corps, with a think tank. It will help, I think, tie together all the

other schools which provide training in the course of a marine's career.

At the most junior level, General Gray, you have increased the quality of the school for training the infantry and the PFCs who just completed boot camp.

Most especially, I would like to comment upon your forward-looking service to the country. Long before Senator Kennedy and I and others were discussing low-intensity conflict, you were out there making changes in the restructuring of the Marine Corps to perform the mission that has always been there for the Marines, which has gone largely unnoticed.

As a result of your efforts in that restructuring, again, we have seen the benefits of that forward-looking vision on your part, most recently in the Persian Gulf, but elsewhere as well.

I want to join with Senator Kennedy in commending you for being just a truly outstanding, not only General, but citizen of this country and for the enormous contribution you have made. I welcome your testimony today.

STATEMENT OF GEN. A.M. GRAY, COMMANDANT, U.S. MARINE CORPS

General GRAY. Thank you, Mr. Chairman and thank you, Senator Cohen for your very, very generous remarks.

As always, the credit for what we have been able to accomplish in the service to our country goes to the magnificent young men and women that people like me are privileged to serve with.

We have prepared a special statement for this committee, an update, and we have focused on concerns with respect to power projection and regional defense. We would ask that it be inserted in the record.

Senator KENNEDY. It will be so included.

General GRAY. I would simply offer as part of an oral statement that the changes we have witnessed throughout the globe have been well articulated by the two distinguished Senators this morning.

We believe that we have been on top of these changes, and are fully prepared to continue to have the kind of Marine Corps we believe the Nation needs and will demand in the rest of this century.

It is very important, in my view, to remember that our Corps of Marines is naval in character, and the Marine Corps must continue as part of naval power, naval capability, and naval flexibility. Above all, the Corps of Marines must always have a high degree of what we term "aggregate usefulness" to our Nation.

We continued our efforts to shape the Corps in a way that will maintain a high degree of professional expertise across our amphibious and expeditionary roles of coming from the sea and projecting power over the beach. We will be fully prepared to provide a wide spectrum of special operations capabilities today and certainly for many years to come.

Within the document that we have provided is our view of the future in terms of strategic need. In my view, we must have an aerospace, maritime, and continental conceptual thought process within our military strategy of the future. Our Grand Strategy

must concentrate on seeking stability throughout the globe, particularly in the lesser developed regions where many of our vital interests and those of our allies and friends are.

We must, within that context, go beyond pure economic interests throughout the world, because there are a great many people in these regions who need our help. As we witnessed recently with our joint/combined humanitarian efforts in the ravaged area of Bangladesh and Northern Iraq. In other words, humanity must be one of the cornerstones of any future Grand Strategy in terms of what we can do to help.

Within that construct, we are dependent upon air power and aerospace capability. We are dependent upon space, in the private and public sector, and even more so in the years ahead. Therefore, space would be the first pillar.

And certainly a great nation needs a credible land army. In fact, no nation has survived history without a credible land army. This would be the second pillar.

The third pillar, of course, would be the maritime concepts which are of principal interest to this subcommittee. It is here that we must be mindful that we are an island nation. Regardless of what happens politically, our geography does not change.

It has been pointed out a number of times, that our friends, our allies, and our interests lie thousands of miles away from this great country over broad expanses of water. So our ability to operate on the seas, to use the seas, to incorporate that into the stability requirements of the future must be clearly understood and supported. This ability will be particularly important as we draw back from around the world. As we reduce our forces overseas and eliminate the overseas bases, maritime forces will become increasingly more important.

If we are going to have stability, we must have influence. If we are going to influence, we must have presence. In my judgment, the maritime presence is going to be needed more than ever in the years ahead.

As we examine the extraordinarily difficult challenges that we face with respect to defense resources, we would hope that it be kept in mind, because we do have political freedom. We can move where we must move. We can move on a timely basis. We can come out as quickly as we go in, and we can do it with a minimum of geopolitical concern or provocation.

So it is these flexible attributes that naval power and naval capability bring to the joint and combined arena which are of the utmost concern to your Commandant.

There are only a few issues, with respect to the Corps, I would like to address. I remain concerned about the end strength of the Corps. As we know, the Congress in their wisdom in the 1950s created the present force structure of our Corps. It included three division-wing teams in the active structure which today we call Marine Expeditionary Forces. We have one on the east coast and one on the west coast and one in the Far East. They are not mirror-imaged, nor should they be. We also have one in the Selected Marine Corps Reserve.

To give you the readiness that the Nation has come to demand, the end strength must be there to give you the capability needed. I

have said repeatedly, in the out-years, when that end strength goes below 182,000 or dips into the high 170,000s, as was supported by the Senate last year, then we can no longer give you the kind of capability and response that the Nation has come to expect.

This is a very important issue. As we know, the end strength is not quite that high in the submission. Therefore, I would ask careful consideration be given to end strength versus force structure and preparedness.

The amphibious shipbuilding program must continue through the years, modest as it is, because it is here where you get your real sustained power projection. It is only when you come from the sea that you can remain long enough to get a proper geopolitical or military decision. This is not to say that others are not in the power projection arena, but we must be able to sustain that capability.

I am also concerned that we have a proper amphibious shipbuilding program in the future that continues to modernize. The requirements are simple. Without 12 aviation-capable amphibious ships in the future, we will not be able to provide even the minimum kind of capability that we provide today around the world.

I am also concerned about the replacement for our medium lift helicopter, the CH–46E. In my judgment, the time has come for a decision. We are aware of the alternatives. The MV–22 has been well debated here in the Congress, and I am sure it will be debated again this spring. The alternative would be a new helicopter.

My concern is that, if it is a helicopter, it must be a good one. Sending warriors ashore throughout the world in less than full-up helicopters, without the avionics and defensive countermeasures that are required, is criminal. When you take that into account, that is where much of the cost is. This is why we have said consistently that the MV–22, which has the avionics and associated capability, is the most cost-effective replacement in the long term. It is true that in the short-term, where most people focus, the costs for the MV–22 would be higher. However, in the long term, MV–22 appears to be in the best interests of the United States, our allies, and friends.

Either way, the time has come to make a decision in this arena. We are moving further and further away from a replacement capability. We will be on the other side of the margin by the middle of this decade. I would ask that this issue receive careful consideration in the deliberations that lie ahead.

It is always a great honor to come before the Senate Armed Services Committee and this subcommittee. You have supported your Commandant and your Corps of Marines with distinction, and we thank you.

As always, our Corps of Marines stands prepared, and we are prepared today to discuss whatever operations and amplify whatever you would like to hear about, because we really want only to serve.

Finally, as always, we will take what the Congress gives us, and we will continue to give you the kind of Corps you can depend on.

Thank you, Mr. Chairman.

[The prepared statement of General Gray follows:]

PREPARED STATEMENT BY GEN. A.M. GRAY, USMC

Mr. Chairman, distinguished members of the committee, I appreciate this opportunity to appear before you today and report to you on the readiness and capabilities of your Marine Corps.

The dramatic changes in our security environment during the past 2 years have highlighted our need to review and refine our security requirements. In this new and dynamic era, we must review our military force structure requirements and how these requirements may be economized to more closely align resources with means and ends. In the years that are ahead, our military forces will continue to be called upon to conduct a wide variety of operations to include: peacetime presence, disaster relief, humanitarian assistance, crisis response, and conflict resolution. Many of these operations, such as deterrence, presence, crisis response, and protection of American lives and interests overseas, are best performed by naval expeditionary forces.

As President Bush stated in a recent address at Aspen, Colorado, "What we require now is a defense policy that adapts to the significant changes we are witnessing—without neglecting the enduring realities that will continue to shape our security strategy. A policy of peacetime engagement every bit as constant and committed to the defense of our interests and ideals in today's world as in the time of conflict and Cold War."

The emergence of a multi-polar world, with its increasing potential for regional instability and conflict, will have a significant impact on military planning and force structure requirements. Fortunately, we have been studying and evaluating the future world in order to develop a strategy which can meet the demands of a dynamic international security environment. Equally as important we must remember as we develop our military strategy that a significant part of the military force structure needed to execute this strategy is already in existence.

In large part, the deterrence of global military conflict since 1945 and our recent Cold War "Victory" is the direct result of credible United States military power. Unfortunately, recent U.S. military operations in Panama, Liberia, Somalia, and the Persian Gulf have shown clearly that the end of the Cold War has not resulted in a peaceful world. In the emerging multi-polar world, economic and political competitiveness will foster conditions that can create regional instabilities and ignite concurrent, but not necessarily related, crises.

In light of the changes that already have occurred and because of the growing interdependence of the world's nations, the United States must remain globally committed if it is to provide the leadership needed to maintain the political and military stability necessary for economic and social progress to continue around the globe. We must recognize that no matter how hard we try, change will not occur overnight. If we are to be successful we must make a long term commitment and, most importantly, we must have vision.

In this new international environment, we must continue to recognize our responsibility to foster those conditions which promote world stability and peace. Accordingly, we should replace our policy of containment with one of global stability. This policy would provide the foundation for us to maintain the favorable political, economic, and security environment needed to achieve our worldwide objectives.

Our National Military Strategy must continue to have a global focus, even though future military contingencies can be expected to have a regional focus. We must continue to focus our efforts on developing a truly integrated national military strategy. A strategy which integrates the functional capabilities of all the Armed Forces. One which capitalizes on the synergistic capabilities resulting from the complementary integration of our aerospace, continental, and maritime strategies. The strategy we develop must be oriented toward the projection of influence and power around the globe across the spectrum of violence from peacetime presence, to disaster relief, to crisis response, to conflict resolution.

The changes in our security environment requires that the focus of our military planning efforts be modified. In this new era the United States must balance and enhance its capabilities for resolving multiple, unrelated crises. Throughout the Cold War, the majority of our military planning focused on the extreme end of the spectrum of conflict—preparation for global conventional and nuclear war—under the assumption that countering the Soviet threat inherently prepared U.S. forces for conflict with any less-capable adversaries. Only a small portion of our active force structure (Carrier Battle Groups, Marine Expeditionary Forces, Army Airborne and Airmobile Divisions, Tactical Fighter Squadrons and Airlift Squadrons) provided and continue to provide the general purpose forces needed to respond to a wide range of conflict situations. With the receding threat of global war with the

Soviet Union, the United States should now concentrate its planning effort at the center of the spectrum where conflict has historically occurred and to which U.S. Navy and Marine forces have historically responded.

ENDURING CAPABILITIES AND EMERGING THREATS

Today the threat posed by the Soviet Union has changed dramatically. Beset by a wide range of fundamental economic and political problems, it is now very unlikely that the Soviet Union or its allies could wage a conventional attack without an extensive period of forewarning. Nevertheless, for now and the foreseeable future, the Soviet Union's nuclear arsenal makes it the only nation capable of threatening our national existence. Prudence requires that the United States maintain forces of sufficient capability and numbers to deter any renewed threat to our Nation or our allies.

There remain, however, other forces today that threaten the stability of our interests and those of our allies. A growing number of countries and organizations are acquiring the means of waging intense, violent conflicts with weapons of great lethality and destructiveness. Ambitious regional powers, resurgent nationalists, ethnic and religious rivalries, drug cartels and terrorist organizations present very real threats to the enduring interests of the United States, our friends and allies.

At the same time, it is unlikely that we will always be able to establish political unity among our allies. Without the unifying effect of a common threat, current friends and allies may not be always willing to respond to indirect threats to their interests. This will make it at times difficult for the United States to maintain overseas bases and overflight rights, or to exert political and economic influence abroad.

STRATEGIC CONSTANTS

The United States remains fundamentally a maritime nation, and must retain and demonstrate the ability to secure the seas that connect this country to its allies, commercial partners, energy supplies, and resources. As President Bush has observed, "No amount of political change will alter the geographic fact that we are separated from many of our most important allies and interests by thousands of miles of water." Naval expeditionary power gives the Nation the ability to preserve the vital links to our allies and economic partners, to maintain a visible presence throughout the world, and to project military power over the horizon whenever and wherever necessary.

Today your Navy and Marine Corps, thanks to the vision of our civilian and military leaders and the support of the Congress and the American people, possess a significant capability to maintain stability, to deter a resurgent or emerging global threat, to respond immediately to even the most distant threat to regional stability, and to provide humanitarian assistance. Therefore, in the case of the Marine Corps the emerging security environment should not have a dramatic effect on our roles and missions or our force structure . . . it should be business as usual.

In legislating the Marine Corps role as our Nation's force-in-readiness, Congress recognized its aggregate utility, effectiveness, and affordability as a ready combined arms force. Congress envisioned a Navy-Marine Corps team possessing the capability and flexibility to operate worldwide independent of overseas bases or overflight rights. As a result, Naval expeditionary forces in existence today represent the culmination of decades of planning and investment, with the flexibility inherent in existing naval expeditionary forces, the United States is uniquely prepared to adapt to an evolving and dynamic world order.

NATIONAL SECURITY STRATEGY

The President's National Security Strategy contains the following essential components: Deterrence, Forward Presence, Coalition with Allies, and Force Projection. In his August 2, 1990 address, the President identified the additional requirement that the Nation retain the capacity to rapidly expand its forces should world events dictate.

Deterrence, both nuclear and conventional, costs less than any level of conflict and will remain the cornerstone of United States defense policy. Nuclear deterrence will be required as long as any country possesses the capability to strike the United States or endanger United States forces abroad with nuclear weapons. If deterrence should fail, forward-deployed forces afford a timely response at the point of conflict.

The forward presence of capable naval forces in close proximity to potential areas of world crisis remains a key element of U.S. security. In addition to contributing to deterrence, forward deployed naval expeditionary forces strengthen our ties with allies and serve as a visible sign of U.S. commitment. Naval expeditionary forces

provide the Nation with the capability to respond effectively to crises independent of overseas bases and access agreements. Routine forward deployments, logistic self-sufficiency, and ambiguity of intent make naval forces largely immune to the political constraints that could inhibit land based forces.

Simply maintaining the capability to keep the sea lines of communication open to our allies and for resource movement is insufficient to fully protect America's vital interests. The maintenance of stability also requires that we be able to affect events on land. In some cases, this can be done through a combination of locally-based forces and the introduction of combat forces transported from the continental United States. For much of the globe, however, the Navy and Marine Corps will remain a primary means of maintaining regional influence. Since most of the world's population lives within striking distance from the sea, our naval power projection capabilities are particularly useful to deter aggression, apply force at the appropriate place and time, or to enable the introduction of follow-on forces.

In this changing world, we must craft a security policy and military strategy that is based on a realistic assessment of the geostrategic climate and our Nation's need to maintain maritime superiority. In this regard, it is our view that naval expeditionary forces will continue to provide a significant portion of the military capabilities needed for deterrence and crisis response in the evolving security environment.

POWER PROJECTION

Since World War II United States naval expeditionary forces have been a primary instrument for protecting U.S. interests and for signaling our intentions or interest. The shift in focus of our security efforts from the defense of NATO toward the more likely involvement in regional crises, highlights the continued importance of naval power projection forces for crisis response. The essence of this force is the strike capability of aircraft carrier battle groups and the over-the-horizon power projection capability of amphibious task forces and Marine Air-Ground Task Forces. These forces provide an important forward presence in peacetime and an enabling capability for the introduction and support of follow-on heavy combat forces of the Army and Air Force. Ensuring a robust power projection capability requires that the United States:

— Replace our aging fleet of medium assault lift helicopters.

— Enhance our over-the-horizon capability by modernizing our amphibious assault vehicle and improving our command and control capabilities.

— Provide a potent modern amphibious force.

— Keep the proper balance between amphibious lift, sealift, maritime prepositioning forces, and land-based prepositioned equipment.

— Upgrade our command and control systems for joint and combined operations.

— Continue to improve our nightfighting capability.

ENHANCING FORCE MULTIPLIERS

United States naval forces must continue to exploit and develop force multipliers which will preserve and enhance our combat superiority over numerically superior forces. Likewise, interoperability of C³I systems and the capability to exploit space-based resources is essential for future joint and combined operations.

Proficiency in complex warfare areas such as carrier battlegroup operations, management of the electronic spectrum, and over-the-horizon amphibious assaults can only be achieved through rigorous training. As the Commander in Chief has said, "True military capability never exists on paper. It is measured in hours spent and experience gained, on the training ground, under sail, and in the cockpit."

SEALIFT

An equally vital, though until recently less recognized, contributor to the maritime power of our Nation is sealift. For example, 95 percent of all cargo required to support Operation Desert Shield was delivered by ships. While the current shipping pool is sufficient for scenarios with long warning times, even very large numbers of fast sealift ships would not be sufficient for most short warning scenarios. In order to support future joint operations approaching the magnitude of Desert Shield, we need to enhance our ability to transport heavy combat forces. Accomplishing this mission will require a careful balance between airlift, pre-positioning, and sealift. We must adopt a strategy which assures United States self-reliance in its sealift capability. The United States can no longer ignore the requirement to revitalize its maritime force. We must strive to attain strategic self-sufficiency in this important area.

JOINT OPERATIONS

Each of the military services has unique capabilities which are maximized during various phases of combat operations. The sequencing of forces across the full spectrum of combat operations capitalizes on the institutional ethos and operational focus of each service. The linkage between services has been formalized by involving component commanders in the planning, exercise, and contingency phases of operations and in the development of joint doctrine. The concept of joint force sequencing integrates complementary capabilities when forces must be introduced over several phases of a campaign. Naval forces are an integral part of this force sequencing concept and, in many cases the lead element.

When employed in presence and stability operations, forward-deployed naval expeditionary forces play a crucial role in any effort to deter a crisis, provide relief, or stabilize a volatile situation. These forces are inherently mobile and provide a range of options, particularly when employed in combination with selected Army and Air Force units. In the event that no forward-deployed forces are on station when a crisis develops, forces must be shifted from other theaters or transported from CONUS by sealift or airlift. Sea-based naval expeditionary forces provide a capability for prompt direct action, in concert with USAF tactical air and Army special forces if available in theater.

Some responses will require the insertion of forces capable of direct action. In such cases, naval expeditionary forces are able to launch both strikes and assaults in order to seize entry points to enable the introduction of follow-on forces. After securing access, naval forces provide the entry for supporting forces such as Maritime Prepositioning Ships. The introduction of complementary land-based tactical air units and Army airborne forces expands force projection capabilities and completes this phase of the joint sequencing concept.

In cases where unopposed access is achieved, forcible entry operations can be bypassed. In this case amphibious and air-based combat power can be concentrated more rapidly than if forced entry was required. If these efforts above do not terminate the conflict, the stage is set for decisive action by additional joint forces.

The power projection forces of the Navy and Marine Corps can pave the way for the introduction of heavy Army divisions and Air Force air wings. As the responsibility for expanding an operation is transferred from naval forces to Army combat forces and Air Force tactical air wings, the CINC has the option of reforming the Navy and Marine Corps forces into a regional reserve for use elsewhere within the same campaign, holding them for other contingencies, or both.

THE SHAPE AND FUTURE EMPLOYMENT OF NAVAL FORCES

One factor which promises to have a significant effect on the shape of the future Navy and Marine Corps is the predictable reduction in the size of U.S. military forces. In a world where defense requirements are not driven by the need to respond to a monolithic global threat, the Nation's defenses can be sized more closely to actual commitments and foreseeable instabilities in the world. While these commitments may not appear much different now than they have been for the last 45 years, the economic realities and priorities of the new world nevertheless require that the Nation's naval forces decline in size. However, we must not allow our forces to become hollow. There are limits to the amount of reductions which can be made and still maintain the capability to execute assigned missions.

For the United States to continue to support its allies, protect its citizens and interests, and maintain its access to overseas markets, we must discover ways of operating our forces with greater economy and efficiency. A new emphasis on flexibility and versatility is required.

One of the more significant results of the diminished Soviet threat is that we cannot focus our attention and efforts on operating in areas of traditional U.S. and Soviet confrontation, such as the Mediterranean, the Far East and the Indian Ocean. Naval expeditionary forces must operate globally in all areas of U.S. interest.

The level of presence required in a given region will vary depending on considerations such as economic interests, regional instability, and the strength of local allies. Concurrent with this new flexibility in operational requirements will come reductions in naval force levels. These reductions will dictate that our warfighting CINCs carefully consider how they deploy existing assets and, we must carefully weigh each reduction in naval presence to determine its implications upon local perceptions of U.S. commitment and resolve.

FLEXIBLE EMPLOYMENT

Reductions in Navy force levels will inevitably require that we change the way we deploy our ships and aircraft. At the same time, reductions in the number of overseas bases will place an increasing responsibility on the Navy and Marine Corps to maintain a forward U.S. presence. In the future, we will deploy naval forces in several ways. When the situation allows, smaller naval forces will be tailored for a specific mission and deployed outside of historical rotations or patterns. Naval forces will no longer be "tethered" to a specific region, as has been the case in the past. With a smaller number of deployable forces, ships will move between theaters of operations depending upon the emerging requirements. Once in a region, naval forces may be dispersed to maximize their political impact, while maintaining the ability to quickly concentrate into a major force should a crisis arise.

The Marine Corps has developed an array of improved deployment and force closure packages known as Deterrence Force Modules (DFMs) and Crisis Action Modules (CAMs). DFMs and CAMs allow the CINC to organize a Marine Air-Ground Task Force according to the capability he specifically requires, using virtually the entire Fleet Marine Force structure as a reservoir of sustainable combat capability. The CINC can tailor the composting of the desired MAGTF to his specific needs, employing any desired combination of the three deployment methods used by Marines (Air Contingency Forces, Amphibious Ready Forces, and Maritime Prepositioning Forces). This building-block approach provides the best utilization of mobility assets and available time. DFMs and CAMs provide the CINC with a flexible force option for use in both deliberate planning and crisis response to real-world events.

Whatever the nature of our changing security environment, national decision makers will continue to rely heavily on naval forces. Because of their proximity, endurance, sustainability and inherent defensive and offensive capabilities, naval expeditionary forces will continue to be called early on a crisis.

THE KEY COMPONENTS OF NAVAL FORCES

Technology is changing the face of warfare, and the Navy and Marine Corps are at the leading edge of this movement. Developments in precision guidance, satellite navigation, cruise missile, advanced radars, stealth technologies, and worldwide communications have been incorporated into our force structure and tactics. Since ships and aircraft often have lifetimes exceeding 30 years, adopting the best of these new technologies to proven concepts and platforms holds the most promise for meeting the challenges of an uncertain future.

THE CARRIER BATTLEGROUP AND MARINE AIR-GROUND TASK FORCE

The most flexible elements of our military force structure and a primary choice for projecting U.S. power and influence are our carrier battlegroups and amphibious task forces. These powerful units are composed of an aircraft carrier, amphibious ships, Marine Air-Ground Task Forces, several surface combatants, and one or more nuclear attack submarines. They can be supported and augmented by Maritime Prepositioned Ships, combat logistic ships, land-based maritime patrol aircraft, and sophisticated space-based surveillance and communications systems. They can be ready on short notice to conduct sustained combat operations anywhere in the world. The composition of these forces can be tailored to the requirements of each contingency.

The fleet's force projection capability is expanded by Marine Air-Ground Task Forces (MAGTFs). MAGTFs are organized to respond to a specific mission, and have capabilities ranging from providing mobile training teams to conducting amphibious assaults from over-the-horizon. Each MAGTF has a command element, a ground combat element, an air combat element, and a combat service support element, each of which is tailored to the specific mission.

Using the flexibility inherent within the Marine Corps' force structure of three active and one reserve divisions, three active and one reserve air wings, and three active and one reserve force service support group—organized into Marine Expeditionary Forces—MAGTFs of whatever size can be readily assimilated onto larger, more capable MAGTFs. This process of "compositing" permits MAGTFs to deploy by various means and to rapidly organize according to the capabilities required for the specific theater of operations. As MAGTFs are composited, they acquire the capabilities of the units they incorporate.

The source for all Marine Corps' task organizations is the Marine Expeditionary Force. The MEF not only deploys smaller MAGTFs, but it is the operational task force for all contingency plans. The three active Marine Corps Expeditionary Forces

provide global coverage for regional planning, and are the primary organizations for all Marine combat operations and peacetime preparedness.

FLEXIBLE EMPLOYMENT OF FORCES

Forward presence is the key to stability operations. In peacetime, special naval expeditionary task groups can be forward deployed and employed to promote stability and demonstrate continued resolve to protect vital U.S. and allied interests. Special task groups combine individual units usually on a level below that of a carrier battlegroup or amphibious ready group. They permit rapid response to situations ranging from disaster relief to crisis intervention, and conserve resources by matching force requirements to the anticipated threat. When it serves national policy, such task groups can be withdrawn unilaterally without the heavy political costs associated with the movement of land-based forces.

While active forces are responsible for immediate peacetime presence and crisis response, reserve forces, the "Total Force," provide backup for crises as well as a pool of trained manpower available in the event of a major conflict. Achieving a proper balance in the active/reserve mix will play an important part in maintaining overall force readiness.

MAINTAINING HEDGES AGAINST FUTURE UNCERTAINTIES

Given the uncertainties of the future, it is imperative that the U.S. provide hedges against unforeseeable turns in the geopolitical climate, or changes in our potential adversaries' correlation of forces. Maintaining maritime superiority remains essential to preserving American access and influence abroad. This requirement is a fundamental principle for a maritime nation like the United States.

The United States has always relied on its technological edge to offset the need to match potential adversaries' strengths in numbers. Protecting the country's technological edge in vital defense industries means continued investment in research and development, and ongoing enhancement of our industrial competitiveness.

As President Bush has noted, the Nation's capacity to rebuild its forces is a strategic asset which cannot be allowed to decline in an era when active forces are at the minimum level needed to ensure peace and stability. Inseparably linked to America's technological edge is the preservation of its strategic industrial base, centered around critical capabilities such as aerospace design and submarine construction, and continued access to strategic materials and energy sources.

Finally, the most difficult challenge will be in sustaining the operational experience gained during the last 10 years. While certain material stocks can go into deep reserve, the same is not true of perishable warfare skills, or of highly trained personnel whose abilities are the foundation of U.S. combat capability.

CONCLUSION

The fundamental question for strategic planning of forces in a new geostrategic era is: "What size force do we need for the decade of the 1990s and beyond?"

This size will be determined by three criteria. First, we need a force capable of supporting the President's National Security Strategy. The highest priority is to retain sufficient strategic forces to deter a resurgent global threat. We must also sustain a credible and capable forward presence to protect enduring United States interests. In addition we must be able to respond effectively to crises by maintaining the technical ability and level of training needed to project power when and where needed.

Second, we need a force which can sustain the level of readiness and response capability required to implement that strategy. To sustain that level of readiness, our ships, submarines, equipment, and aircraft must be well-maintained and combat ready. Sufficient time and resources must be allocated for overhaul and maintenance. We must also afford opportunity for sufficient basic and ongoing advanced training in a realistic stressful environment.

Finally, our people remain the strong foundation upon which United States' maritime strength is built. The Armed Forces must continue to attract and retain the best of America's youth. To do that we must sustain our force in a manner which affords our sailors and marines a realistic quality of life, including stable deployment schedules and adequate time for maintenance and training. Our sailors and marines must have confidence in their ships, equipment and shipmates.

Using these three criteria we can build a balanced capability. Our force will be smaller and there will be some drawbacks. Certain assets will have to be given up and certain capabilities de-emphasized. Some commitments we previously met may not be met. A smaller force will have less surge capability and, if required, demand

ing, high-tempo operations will be more difficult to sustain. With a smaller force, we will be challenged to maintain the wide balance of capabilities required to counter sudden, unexpected geopolitical challenges and newly emerging threats.

Nevertheless, our enduring interests worldwide preclude the United States from adopting an isolationist stance in the world. We must maintain the constancy of purpose that brought about a favorable resolution of the Cold War and has ensured the preeminent position of the United States in the community of nations. At the same time, we must recognize that crisis and conflict have not been removed from the list of challenges facing our country.

The task before us, one which needs to be kept in clear focus more than any time in the last four decades, is to avoid relearning the lessons of the past, to adjust to the geopolitical and fiscal realities of the present, and to prepare for the future. The Nation will still require a Navy and Marine Corps of sufficient size, quality and ability to ensure freedom of the seas and the projection of naval power to maintain peace and stability wherever U.S. national interests lie. Please know that your Corps stands ready to meet the challenges that are ahead.

Senator KENNEDY. Thank you very much, General.

I would like to talk a little bit about the new national strategy that has been outlined by General Powell, and how you see that new national strategy developing, and the role of the Marines in that new national strategy.

General GRAY. As you have outlined in your statement, we have seen a tremendous change in the past 3 or 4 years. Clearly the global threat and clearly the focus of attention must shift from the Soviet Union and Europe for all of the right reasons.

This does not mean that Europe is not important to all of our interests. It does mean that there is the opportunity for a more stable relationship, and certainly the threat has diminished. Within this construct, we have to be mindful that the Soviet Union still has the nuclear capability that could destroy much of the United States within 30 minutes. The efforts to maintain deterrence, the efforts to continue in the arms control arena to reduce that threat must be continued and supported.

The Soviet Union will also remain the most formidable land power throughout Eurasia, regardless of the many reductions that are being discussed. That has to be considered within the equation.

In my judgment, they are facing many internal challenges. I would argue that these challenges will keep them looking inward for some time to come.

It is elsewhere throughout the globe that I believe we should focus. We have seen what a volatile Middle East can mean. We have been involved in Operations Desert Shield and Desert Storm because of regional instabilities. In the future we must strive to gain a strategic victory geopolitically as a follow on to the military victory.

In the various regions throughout the globe, in Africa, in the southern part of this hemisphere, in Asia, or in the Pacific Rim, all of the ingredients for instability remain. These ingredients are poverty, below subsistence standards of living; and the disparity between the haves and the have-nots.

Conflicts and the potential for conflicts in the mid-to-lower end of the spectrum discussed by Senator Cohen remain. The evolving new strategy must and does take into account a more regional focus. We also must be prepared to respond quickly and decisively to crises throughout the globe. The new strategy incorporates the idea of better contingency forces.

Clearly, as we examine the Unified Command Plan within the strategic context of your question, there are topics which we must consider over time.

What happens in Europe with respect to the Commander in Chief and the Supreme Allied Commander, and what size structure is appropriate? What happens with the structure of the Central Command and the need throughout the Middle Eastern region and portions of Africa? How does that fit in? What about the Southern Command with the Rio Treaty? Should we move that headquarters or roll that up into another command structure? The Strategic Air Command and related Space Command are always a topic for review.

These are the agenda items, which the Department of Defense, the Chairman, and others will be deliberating here in the future. As of this date, they have not been thoroughly reviewed, because it is the type of thing that takes time. And of course, as we all know, all of us on both sides of the river have been quite busy here in the last several months.

I think that the military strategy that is evolving is one that must take the three concepts I alluded to earlier: aerospace; land capability; and sea power; and combine them into a fully integrated strategy. A strategy that draws upon the synergism of all three elements would make it better for all.

One of the key principles that I would offer is the idea of sequencing. Not everybody has to be there first. It does not matter how quickly you get there. It matters how quickly you can do something, as you have alluded to with respect to the deployment of your Marines during the Desert Shield requirement.

This suggests to me that we have different levels of preparedness and different packages available to the National Command Authority. This brings us back to the idea of presence, and the linkage between presence and influence. This linkage must be there in the regions where conflicts are likely to occur, to maintain stability and to influence events favorably for all concerned. This includes maritime ships, battle forces, and people prepared to go to sea and remain there for extended periods. This is to ensure these forces are where you need them, and when you need them for all of the right reasons. So as this strategic thought process unfolds, it will be very important to make sure that the forces, our structure, and our capabilities are aligned to be most effective. This is another way of saying, that within the construct of the Corps of Marines we are fully prepared to do that today. It seems, to your Commandant, to make little sense to reduce too much of that kind of naval Marine capability, especially if we are creating some other kind of capability to move in and do these same things.

Now, that is not to say I do not support the Army's idea to be even more prepared for contingencies. I do support it for all the right reasons. Primarily, there are no crowded battlefields, but I am concerned about where we are headed with regard to power projection forces. I am also concerned about some of the dialogue I am hearing on both sides of the river with respect to air power. The concept that we can do certain things from regional bases, and therefore there are less requirements for battle groups and battle forces. This simply does not square with history or my reading of

the future. You need both kinds of capability and in the right balance. As a great power, you must always be able to fine tune your power projection capabilities right up to the 11th hour. You must have the capability that our carriers and related forces give us. These forces allow us to move, remain flexible, and have positive control right down to the very last moment.

The Corps of Marines, as I have stated earlier, needs a certain end strength to provide the kind of structure that is responsive. We deployed 91 percent of our operating forces around the globe in the past year as opposed to the normal 33 percent. We never had less than 4,000 people in the Philippines during the height of Operation Desert Storm. We met our commitments in Northeast Asia to include Team Spirit-91 and our commitments in Thailand, which included counternarcotics operations along the border in the Chung My district. Hundreds of marines were involved in Central and South America in counternarcotics operations throughout the height of the crisis. No less than 3,000 warriors and amphibious ships kept the lid on the Mediterranean while we focused on Iraq and Kuwait. You have already alluded to the contingency operations in northern Iraq, and the efforts of our warriors that are still in Saudi Arabia are ongoing. As we withdraw from Kuwait we are reconstituting the Nation's Maritime Preposition Force which was so useful during Desert Shield and Desert Storm.

So it takes capability, and it takes ships to do these kinds of things. We have conducted a very detailed, analytical study which lays out what we think the requirements are. I would hope that the Navy/Marine Corps capability force we have come to look at as the Nation's premier force in preparedness will not be reduced. I would hope that as we continue to steam in an era which perhaps will place more and more demands on our kinds of expeditionary expertise we will not reduced the forces that are most relevant disproportionately with the rest of the Department of Defense. Quite candidly, in my judgment, the Department of the Navy appears to be somewhat under funded in terms of the requests, and certainly your Corps of Marines continues to be underfunded when you look at what we are asked to do.

Senator KENNEDY. Let me perhaps sharpen it a little bit. As I understand, the Powell strategy is talking about a strategic force—Pacific, Atlantic, and contingency force—do you see in an operational way that there will be a difference in the way the Marines will function in their role?

General GRAY. I think in fairness to Chairman Powell, the concepts and thoughts that he has discussed have not really been offered as hard concepts. He has been trying to carry out his missions and tasks and is examining alternative ways to accomplish them. The joint staff has been assisting him. We have talked about these ideas from time to time, but we have not reviewed them formally. Mr. Chairman, from the standpoint of the Unified Command Plan process, in my judgment, that review will take place in the next year.

I believe the current year review, that is, the one that would come to you in August of this year, as specified in the Goldwater-Nichols legislation, would be more on the strategic side. I do not know, and I would not pre-empt the process. I do not think the

command structure in the Unified Command Plan that you have outlined and many have talked about is included this year. I think it is too early to bring that type of thing up, and I would move that out another year or so for analysis.

However, let me just say that the Marine Forces are fully prepared today to make their contribution to all of the above, all of these contingency ideas, and all of these expeditionary thoughts that are flown around. So, the Marine Corps is there, and it is in place. The Marines are prepared today to operate under any joint or combined structure. We are fully prepared, and we are fully capable to be a joint task force as in Honduras this spring, another exercise that we operated for the Department the Defense. Quite simply, we are a pretty great package to have and most useful. I would not see a different approach here.

I am concerned that we have a balanced power projection capability from the sea, because it is from the sea that you draw upon your sustainment and your flexibility.

Senator KENNEDY. Let me turn briefly to end strength. What can you tell us of the current recommendation of reduction of 19 percent—where will those reductions occur? Obviously, there is going to be a review as to the amount of reduction, and then there will be an examination when that reduction comes, where it comes. Can you tell me where the current recommendation is actually implemented, and what it would mean in terms of reduction of capability?

General GRAY. In terms of our Corps of Marines with the current allocation, there is a serious deficiency with respect to our combat service support and our capability to sustain what we have to do around the globe. This is, of course, the capability that stood us in great stead during Desert Shield and Desert Storm. As you know, we were able to support ourselves well beyond the 60 days that we were supposed to, and are still doing that today.

It will also require a reduction in the amphibious forces and the expeditionary capability available in the Mediterranean, in the Atlantic, in the western Pacific, and in the eastern Pacific. You simply will not have the forward presence that you are used to having today. You will have to reduce some of your capability in the Far East. This is of great concern, because there is more and more interest, challenge, and need to be flexible throughout the Pacific basin. For some years now, we already do more trade there than we do in Europe. And the distances are immense in the Pacific. So it is crucial to protect our forward logistics base in Okinawa, and it is essential to be able to have sufficient forces to be operative throughout the region.

We will have some vertical cuts and, in the Corps, when you cut people, you cut muscle. As I have said earlier in testimony, about 70 percent of your Corps are in the operating forces. Three years ago when we had a manpower reduction, we reduced as you recall, three infantry battalions. So you are cutting muscle out of a balanced air-ground-logistics team. If we follow this plan in the 5 and 6 year time frame with just a minimum of adjustment as the Senate Armed Service Committee set forth last year, you can avoid that. That is the impact that we have.

Your warriors are going to be asked to do more. They cannot do much more than they are already doing for the Nation today. It is not fair to the men and women and to their families. I have combat formations today who did not participate in Desert Storm that have been out of the country 14 and 15 months as part of a 6-month deployment. Since the law in 1952, the average strength of the Corps has been 196,500. If you take the Korean and Vietnam war increases out of that, the average strength is 182,714. We have 40 years of audit trail here, supported, I would add, fully by the Congress. This lays out what you need to do—what must be done. We do not see that changing.

Senator KENNEDY. Senator Cohen.

Senator COHEN. Thank you. General Gray, in other words, the needs are not going to change, but the assets are changing significantly.

I want to talk a moment about ship-to-shore fire support. We had two battleships in the Gulf. Had you been required to actually make that amphibious landing, would the fire support coming from the two battleships have been sufficient in your judgment?

General GRAY. Barely, in my judgment, Senator. It would have depended on which assault plan we executed. We had six plans as you know: two that we did not intend to use south of Kuwait City, and four others that were very crucial. The battleships were of great value in tying down the forces along the coast and in inflicting considerable damage in support of the troops that advanced along the coast. They were crucial. The two battleships were in fact vital. The other naval gun-fire ships have greatly reduced range, and they do not bring anywhere near the capability to the battlefield that is required.

In the future, we hope that we can come to grips with the fire support from the sea issue. There are ways to do this with technology, which you are very familiar with, and your Commandant strongly supports this. The irony is that the battleships are one of the most useful and versatile platforms for the rest of this century and the next. They are ideal for the mid-to-low end of the spectrum of conflict, and they are virtually unsinkable. With the 16-inch guns, the Tomahawk, cruise missiles the ability to operate remotely piloted vehicles off the stern, the advances in surface fire support, and built in command and control aspects of a battleship are very formidable platforms.

They can actually take their place as a battleship battle group and give you a wide range of flexibility. I am well aware of the advantages and the disadvantages, and I am aware of the numbers of people it takes to run a battleship, but to see them leave the inventory is one strategic decision you would not do. The decision has to be driven by other kinds of considerations.

Senator COHEN. Have you recommended to the Navy that the Navy adapt the Army's MLRS/ATACMS program for ship-to-shore fire support?

General GRAY. I have been a strong supporter of that type of approach for many years, and I am going to put that in writing and get it straight once and for all what the advantages of that type of approach are. I am well aware of your concern, and I think that

this system has tremendous potential. We will put that in writing here very quickly.

The Army MLRS idea is a good one. We did not adopt it for the Corps for a couple of reasons. It is expensive, but more importantly, it is big. We still have to come ashore, so size and weight are a consideration. I have been an advocate of taking half a pack of rockets and developing a lightweight, simpler launcher system from existing vehicles, which we demonstrated in 1979. We have reenergized that thought, and that same kind of technology and conceptual approach applies to what you are getting to here with respect to coming from the sea.

I think there are a number of ways which we can take advantage of MLRS and its related technology, particularly the advanced package for MLRS which will serve us well in coming from the sea. It is ironic that we had a better capability to fire rockets from the sea in World War II, and Korea than we have today. The old landing ship rocket idea was not all bad.

Senator COHEN. General, could you give us your assessment of the night fighting capability of the Marine Corps in the Desert Storm Operation? Focus on night vision goggles, pilot's night vision goggles, thermal sighting for the LAV–25 and M60 tank, and the night fighting capability of the Cobra.

General GRAY. The night fighting capability demonstrated in Desert Storm was superb. Our youngsters were able to operate, move, think and be most effective at night. They were able to out maneuver the Iraqi forces, get behind them, and really defeat, neutralize or take out of the problem 22 Iraqi divisions.

Night fighting must start with a state of mind. You must be comfortable at night without technology. We have long had in the corps a positive program that says all training will have at least 50 percent night-type training. Now, technology, through night vision goggles and through sights and the other items that you mentioned, gives us an added advantage.

Our night helicopter fleet is not fully equipped with a optimum night fighting capability. We have put this on the front burner as part of our special operations requirements. We also put this on the front burner when I came to town in 1987. These programs unfortunately are not glamorous, and they frequently get lost in rollups. We have demanded that they be protected now and are now protected. I would request that this subcommittee ensure that what is in the President's budget with respect to night fighting enhancements for our helicopter fleet be protected.

We are in the process of building five night targeting systems for our AH–1W aircraft which will be superb. There is a plan to follow procurement until all of our helicopters have that capability. The thermal sights for light armored vehicles, of the type that you would really like to have, are a bit down stream in terms of technology and application. We did move very quickly over Christmas to procure what I call "poor man's" thermal sights into the hands of our LAI warriors. The youngsters report to me that they performed superbly.

So we must continue these product improvements, and really in low order in terms of dollars but continue aggressively to improve the systems we have to increase our ability to operate not only

throughout the night but all weather. That would take you, for example, to the advanced radar for the AV–8B which in my view is a must if you are going to truly have the capability that we need. While I am on the topic of AV–8B, we must be mindful that we lost six aircraft and that we never bought the attrition pipeline aircraft. However, we would not have bought any if it had not have been for the Senate and the Congress and the decade of support.

We need to keep that program moving, and we have come up with a concept to do that. We want to take a couple of crash damaged aircraft and make some modifications to keep that line operative. We have strong interest from the Italian Government and the Spanish Government in a number of aircraft radar improvements that they would like to procure. We would like to see this program continue, because it is very, very crucial to us.

Basically, our test systems were superb, and we had the upgraded system for that capability on the HMMWVs, as well as the dutch-mounted version. We did very well at night. The remotely-piloted vehicles were superb, and they flew over 11,000 missions. We had pretty good tactical intelligence at all times after the attack started. Our ability to conduct SIGINT operations day and night also paid off for us tactically, and indeed, tipped us off to a night attack on one of our command posts by two Iraqi brigades.

I believe that we did extraordinarily well, but I believe that it was our people that made this work, and, if we take advantage of technology, we can be even better.

Senator COHEN. Thank you, General.

In the interest of accommodating my energetic friend over here, I yield.

Senator MCCAIN. Thank you very much.

General, there are just a couple of comments that I would like to make. First of all is to restate the obvious. We are incredibly proud of the performance of the men and women and equipment.

I am also very interested in your views as they evolve over the coming months on the role of women in combat and whether there should be any changes in that particular policy. I will look forward to those views. As you know, Senator Glenn has scheduled a hearing on this issue for June 18. I think, in light of the Persian Gulf experience, it is very appropriate that we review the policies concerning women in combat.

Second of all, you mentioned your views on air power, and frankly, we are not in disagreement. I do not believe that air power can win every war. I believe that air power could win this particular war because of the unique circumstances involving geography, weather, the fact that there were 23 airfields available to land on, et cetera.

We do not want to over emphasize the lessons being drawn from the role of air power in the Persian Gulf. There is no other place in the world that we could mount that kind of air offensive under those conditions. If the terrain of Kuwait had been triple canopy jungle, then I would suggest that you are entirely correct, the battlefield would have been significantly different.

I believed correctly that in the case of Southwest Asia, air power would destroy the ability of the Iraqi troops to fight and resist. Clearly, the casualties were extremely low despite the predictions

of many so-called experts and think tanks in Washington who consistently predicted 10,000 to 40,000 casualties.

I hope we do not forget the lessons we have learned from so-called Middle East experts that were so dead wrong. All of us are responsible for our actions and our predictions. We are responsible for the things that we are wrong about as well as what we are right about. I hope we do not forget them.

I hope we do not forget your statement that 95 percent of the cargo that was delivered, was delivered by sea. As we look at our future requirements, it is absolutely vital that we give some priority to our sealift capability, and work to augment it.

I blame the lack of attention that sealift has received on myself, the Congress, and everybody else who has neglected this non-sexy aspect of the defense budget. I am not sure that even a man of your courage would have liked to have gone to sea in some of those ships that we used to transport equipment to the Persian Gulf.

As a follow up to Senator Cohen's remarks, the Army also obviously did well with their helicopters. They used helicopters with the significantly enhanced capabilities that the Apache helicopter gave them, such as night-fighting and standoff capabilies. The Hellfire missile is good example of the advantages offered by the Apache.

Do you contemplate a need for these kinds of advantages offered by the Apache helicopter?

General GRAY. Well, I think, first of all, of course, the Apache helicopter system is a very fine system, and it is well suited to the overall Army requirements.

When I was part of the driving force behind enhancing Marine Corps helicopter capability, and enhancing the night and special operation requirements, we laid out a plan for the AH–1W to give us everything that we needed. As I alluded, we are finally getting around to doing that after several years.

The AH–1W meets our requirements far better than the Apache. It is totally marinized, as you know, for sea operations. It has the various attributes you must have aboard ship. For example, you must be able to fold the blades so you can move up and down the shipboard elevators. You must also be able to defend against corrosion, salt water-type challenges, all that type of thing. The Cobra has a very nice mix of ordnance, and indeed, can fire more different types of ordnance than even the Apache.

The key is the night targeting system, which is what we are putting in the system now. Of course, it is much more economical for us to have the AH–1W, which is another way of saying that we made these decisions over the years. We just could not afford the Apache for the type of thing that we had to do. I am comfortable with the AH–1W upgraded for the night-fighting capability. It will give us what you would want in an attack helicopter.

Senator MCCAIN. But there is a clear requirement for upgrading?

General GRAY. Absolutely. Yes, and that is in the budget. We would ask that you continue to support this request.

Senator MCCAIN. You might remember last year we fought an amendment on the floor of the Senate to retire the battleships. We are talking about trade offs here. One of the continued responses I get from the Department of Defense is that the battleships just re-

quire too many people. Are you concerned about the manpower intensive aspect of the battleship?

General GRAY. That is a challenge that you face. There are two things about battleships that have hurt the perception of the battleship. The large number of people that it takes to operate that platform, especially when people are interested in early-on reductions and total TOA reductions. People are always considered first because of the dollar-for-dollar math involved.

The second part, of course, was the disastrous *Iowa* accident, which I think was the final event that made the battleship very, very vulnerable. If you look at it from the standpoint of the operational requirements and the type of military strategy we would be exercising in the future, the battleship remains an extraordinarily versatile platform. When you look at that and then look at the end-strength figures, you have to take that into account.

If you look at the overall end strength situation within the Department of Defense and then look at what you can do with these types of platforms, and for how long you can do it, then I think it fares very well. Unfortunately, I am in a minority of opinion on this idea.

Senator MCCAIN. Finally, General Gray, I share your concern about the reduction in amphibious lift capability. It is right up there with sealift in my view. I intend to work with you, the Department of Navy, and the Department of Defense to try and turn this around. We are facing obsolescence in amphibious capability. We have too little as it is.

I believe, as do many others, that power projection is the way that the military has to be shaped. If we are to move to a "maritime strategy," we have to do something to turn the situation of amphibious lift capability around. I think it has to be a major issue of discussion and debate.

Finally, I would like to, again, congratulate you for the continued candor with which you present your views before this committee and in public. I think you balance the loyalty that you clearly bestow on the civilian leadership with the requirements that you fully appreciate to present your most honest, personal and candid views to this committee and the American people. I think it is very admirable and I, for one, appreciate it very much.

Thank you, Mr. Chairman.

Senator KENNEDY. General Gray, to sharpen this last point in terms of the sealift, what is the balance? What do you think the balance should be between the strategic sealift, the amphibious sealift, and the MPS?

General GRAY. I think that we have to look at that as your question implies, as a total system of capability. I think it is important, as Senator McCain has pointed out, that we not learn the wrong lessons from Desert Shield and Desert Storm. We have already addressed the bases that were already in place.

The Marines alone ran two airfields in Bahrain and Saudi Arabia. They looked like they were built for Marine Aircraft Wings, which of course are much larger than Air Force wings and so on.

From the day we arrived in Saudi Arabia until this morning, we have run the Port of Al Jubayl. We were able to offload three Mar-

itime Preposition Ships at once, the gantry cranes were in place, the warehouses were in place, even the indigenous workforce was assigned to us. Those kinds of conditions are indeed rare. I doubt if they exist elsewhere throughout the globe. Within that context, as the Senator from Arizona pointed out, 95 percent of the beans, bandages, bullets, and fighting capability of the forces were moved by sea.

The sealift actually fared pretty well. There were some ships that broke down and some that took a little bit of bravery to get aboard. Part of that was our fault collectively, yours and ours, by nipping away at some training funding and nipping away at some of those pots. They just were not as ready as you have a right to expect, but on balance, it held up pretty well. So with regard to getting much more fast sealift, I think the congressional-mandated study and the language therein is right. You told us to look at the sealift challenge, include the amphibious lift requirements, and deliberate this very carefully. We need to be careful about speed. Sealift that is good enough is probably a good investment. Fast sealift for another 5 to 7 knots may price you out of the arena. You have to ask yourself, is it worth it, and so these are the tough questions.

The roll-on, roll-off idea, of course, is made to order to reinforce military operations. Unfortunately, it is the least attractive platform for commerce. The ideas of this subcommittee in the past few years of trying to look ahead with advanced technology and somehow, someway, coming up with some sealift that meets both commercial and military requirements, I think, deserves to continue to be a point of focus.

Within that construct, perhaps common hulls and other commonality may be the solution. You have to compromise; maybe you will not get everything you want in the military platform, and you will not get everything you need in the commercial platform, but you get something that both people can use in the early part of the next century. Something that would spark a revival of the American maritime industry, which as we all know, has a problem of ships, people, unions, and law. You all know much more about that than I do.

I think this is right on. The Marines should be considered by the Congress for a part of this improved sealift. For example, it may even be useful to consider a fourth Maritime Preposition Ship set or a total force set that is part active, part reserve, because we have that expertise in the Navy/Marine Corps team, and we have demonstrated its relevance.

You have to make a commitment. It is far more than putting equipment on ships and either tying them up here in the United States or sending them to sea. You need a maintenance cycle, and you need people dedicated to that. Frankly, you have to know about the sea, and of course, that is what you expect us to do.

On the amphibious lift side, I would suggest a re-look with a view towards what it takes to have a modest amphibious shipbuilding program. To get more specific, I spoke about the aviation-capable ships. We have the LHAs. We are building the LHDs. We had a sixth and a seventh ship in the plan, but the sixth and seventh ships have fallen out. It seems to me, that every other year to build

that sixth and seventh would go a long way towards meeting the minimum requirements that you are concerned about.

The second aspect of amphibious lift has to do with the retirement of the ships. You are retiring ships faster than even the block obsolescence would suggest. Some of those ships, in my view, would be candidates for a reserve-type capability.

It is ironic that you and the Pentagon are saying we need more sealift, and you are right. Then on the other hand, you are giving up the most flexible sealift you have, amphibious sealift, which not only can do what the other sealift can do, but it can be arranged so you can also conduct an assault and project power ashore. It just seems to be somewhat out of kilter. I would hope that some balance can be restored. We would be privileged to work with your staff personnel on what our view of the numbers should be.

Senator KENNEDY. We will take you up on that.

Let me ask you about mine warfare, both the land and the sea capability of mine warfare. What did we learn from the conflict in the Persian Gulf that can be useful and helpful to us in terms of mine warfare?

General GRAY. In my earlier statement to the full committee, I used the quote that we have seen that low-cost mine warfare activity on the part of an enemy can disrupt high potential maritime operations out of proportion to the expense involved. That was a paraphrase of a quote after the Korean war. We have seen an unprecedented use of mines by a tyrant in the open seas to disrupt shipping. Mine warfare and mine clearing must be upgraded in the future. It is not an easy technological challenge, by the way, because the closer you get to shore, shallow water mines and mines in the mud make it even more difficult.

I want to go on record as saying that the mine activity did not, as has been alluded by some, who are, in my judgment, ill-informed military people, prevent any amphibious assaults. It was certainly an additional consideration, but with our landing craft air cushion vehicles and helicopter capability, mines did not preclude the amphibious assaults.

The reason we did not make the amphibious assaults was that we were the deception force, and operations took place so quickly ashore that they were not needed. The plan to go into Al Faw Peninsula and seal up Basra from the Republican Guard should they choose to have fought the 7th Corps, and the plan to go through the Umm Qasr port facility so we could reinforce from the sea if the logistics in the desert broke down, all of that was vital to our arsenal of capability in the region.

What we did last fall and winter is continuing. We put together the best minds technically and otherwise to resolve these problems. You looked at a lot of advanced technology in the past year. Beyond, perhaps what we should talk about in the open committee. In addition, we have looked at other nations' capabilities. We have a joint Navy and Marine effort that is going full bore. I am confident that we can make major inroads into this challenge relatively quickly.

Again, that is a non-glamorous type of thing. So I would ask the committee to continue to be concerned, to continue to ask these questions. At a later date, I would be privileged to provide to you

in writing my thoughts on this topic in a classified document, something that would be more appropriate.

[The information follows:]

MINE COUNTERMEASURES (MCM) IN AMPHIBIOUS OPERATIONS

1. This paper relies heavily on a study performed by the Naval Research Advisory Committee (NRAC) in August 1989. Excerpted portions are included as enclosures to explain:

a. The Threat
b. The Current Situation
c. Conclusions
d. Recommendations

2. Despite being almost 2 years old, this study is still valid and remains the most definitive treatment of the subject. The NRAC is currently revisiting the subject in the wake of the recent Persian Gulf war.

3. Doctrinally, the Commander of the Amphibious Task Force (CATF), the senior Navy commander, has the responsibility for all operations, including MCM, up to the high-water mark on the beach. Until recently, the Navy has not applied significant effort/resources to solving the MCM problem in amphibious operations, despite accepting doctrinal responsibility. It has instead, focused on MCM improvements in deeper water. The NRAC panel stated in its 1989 report: "The Marine Corps, recognizing the severity of the threat, is applying a large fraction of its limited resources to acquire any practical near-term systems available and to apply current technology to develop needed operational capabilities. It is urgent that theme efforts be sustained and expanded, and that complementary Navy efforts be undertaken to support its amphibious operations responsibilities." There is a recent initiative on the Navy's part, however, to address this problem an integral part of power projection.

4. The Navy and Marine Corps recently formed, at Congress' direction, a joint Navy/Marine Corps Mine Detection Laser Technology (MDLT) program to address mine detection in amphibious operations. This program uses technology developed by the Marine Corps Airborne Mine Detection and Surveillance (AMDAS) program to hunt mines in the very shallow water and surf zone (the most difficult technology challenge) as well as a contractor-proposed concept Magic Lantern, to hunt mines in deeper water. The MDLT program, currently funded only by the Marine Corps, will recommend an acquisition approach for a detection system in fiscal year 1994.

Senator KENNEDY. We very much appreciate that as well. Let me finally go to the really extraordinary performance of the Marines both with the Kurdish refugees, and particularly now in Bangladesh. I happen to be Chairman of the Refugee Subcommittee, and I have been following this with a considerable amount of interest, as everyone else has. The Marines have done an excellent job in the northern part of Iraq on the Turkish border, and now moving into Bangladesh, which has been absolutely extraordinary.

The best estimates are the saving of about 15,000 to 20,000 lives in the last 2 weeks. It has just been an absolutely extraordinary performance. I know that the Marines have the prime responsibility in Bangladesh, and the official estimate there is 139,000 people killed. It is just a human disaster. Twenty foot waves have moved through that country all along the shoreline for a period of 8 hours where most of the land is 12 to 15 feet above sea level. They had to evacuate a couple of million people out of that general area. Since it is the harvest time, many of the farmers have refused to leave and have had a devastating time. Could you tell us just a bit about both what the Marines have been doing in that northern part of Iraq and what the most recent activities of the Marines are in Bangladesh?

General GRAY. Well, talking of course about the northern Iraq operation first, we used the Marine forces with the Mediterranean Amphibious Ready Group that were in the eastern Mediterranean.

Again with that self-contained package of helicopters, logistics, and Marines. As you know from your visits with us, we train and test our people on humanitarian assistance, and we have a built-in medical capability with our Navy/Marine Corps Team. So they were able to go very quickly into Turkey and to set up along the border and begin to operate in that joint and combined environment.

Our relationship with Turkey has always been strong because we exercise in that region, so that is an important point to think about in the future. That reinforces confidence. We were able to move in very quickly and work with Joint Task Force Bravo, which is the overall coordinating command in northern Iraq, and we provided security and the humanitarian assistance, that you have pointed out to the Kurdish people.

We have a second task force much smaller in size. The big task force is about 2,000 marines. The smaller one is about 200 with the other joint task force. These are experts in running helicopter landing zones, material handling equipment, and helping the throughput of refugee supplies and medical assistance to the Kurdish people.

The effort in Bangladesh—that is being conducted by Joint Task Force Commander Marine General Stackpole, who flew in from Okinawa. The command group has for several weeks been watching the situation there and is very familiar with the challenges. We are using the 5th Marine Expeditionary Brigade that is part of an 8-ship task force that is on its way home from the Persian Gulf to the west coast. They had been alerted to the challenge in Bangladesh prior to leaving the North Arabian Sea, and we broke off from that task force the Marine Expeditionary Unit, Special Operations Capable, to remain as a contingency force in the Gulf.

They have the landing craft air cushion vehicles and a very balanced helicopter capability. They are already ashore as you have pointed out. The need in Bangladesh, aside from a concerted medical effort to try to save lives, is one of not so much providing food but moving food. There is food in the region, but they cannot get it where it is needed. The helicopters and the landing craft air cushions will be instrumental in that effort. We also have to make sure that they have enough water. And of course, on the amphibious ships as well as with our expeditionary reverse osmosis water purification units, we can make water even out of practically mud. It is a medical and a movement type of mission. It is one of extending a helping hand to people who have been crushed by a horrendous storm environment. It is one more thing that balanced forces can do when they come from the sea. With our fairly substantial medical capability afloat, we can operate on people. The overall effort there had involved four of our 53 helicopters and 12 of our 46Es. We have 10 of the light helicopters and some Cobras on board. We are using the landing craft air cushions, the helicopters, and our conventional landing craft.

Senator KENNEDY. Well, it has been a remarkable demonstration of the kind of flexibility that you have talked about. I think it will make an enormous difference to the lives of many, many thousands of people. Senator Cohen.

Senator COHEN. Just one quick question for the record. General, I am going to ask you to evaluate the M60E3 versus the M240 machine gun, and perhaps you would give us your evaluation for the record. On a lighter note, yesterday we had testimony from the various services who were involved in the Persian Gulf. Captain Mike Bowman, who was a former Navy liaison officer on the Hill, had an occasion to testify about his air wing's role in the Persian Gulf conflict. Senator Warner commented that his training obviously had prepared him well for the mission in the Persian Gulf. And I suggested, yes, he had learned how to fly through a lot of flak up here on Capitol Hill.

Another individual who comes to mind, whom you are familiar with, is Jim Jones, who is truly one of the Corps' finest. I believe, he also served as liaison for the Marine Corps on Capitol Hill here in the Senate. He has demonstrated that he is indeed, like the other members of the Marine Corps, capable of engaging in humanitarian assistance to the weak, the needy, and the helpless. No doubt some will say he gathered that training up here on the Senate side.

General GRAY. Well, let me just comment, of course, Jim is a superior warrior and leader of marines. He has long demonstrated his ability to do both of those things. He served as you know with distinction here with the Congress. He served also with distinction as a fighting company commander. I just talked to General Carl Mundy last night who just came back from Northern Iraq. Carl, of course, is the 30th Commandant designate, and he has an extraordinarily high regard for Jim. He said that everywhere he went in the eastern Mediterranean and ashore it was clear that there was enormous respect for Jim and for his sailors and marines. It does not surprise me, and I know it really does not surprise you, but I will be delighted to tell him that once again we will get him into the Congressional Record.

Senator COHEN. Thank you very much.

Senator KENNEDY. One final item, and this is on that V–22 issue. The Navy's budget request included purchasing the new CH–46 aircraft to help ameliorate the inventory shortfalls pending introduction of a replacement that is so far down the road that it will lose its significance.

What would be the considerations that you believe that we ought to evaluate in terms of making our judgment on that request?

General GRAY. In my own personal view, Senator, the evaluation has to look at the options. The options in the broader sense are two. One, is to replace the CH–46E helicopter with another helicopter. And you can do that. However, if you do that, we would hope that you would ensure that the helicopter be of advanced helicopter design or a better helicopter today. When you look at what you can do with helicopters, you can get a little more speed with a little bigger engine. You can do some things with the blades but fundamentally, you are at the outer operational envelop of helicopter technology. As I have indicated, we should ensure that we have the avionics and defensive countermeasure systems to give it a true night operational capability as has been alluded to by all three of the Senators present today. This is where there are cost factors. To focus in a little bit more, you would have to then develop a new

helicopter even though it would look very much like the present one. The earliest that you could introduce such a helicopter into a training squadron, would be 1999 or perhaps fiscal 2000. Then normally it takes a couple of years to introduce them into the fleet Marine force and into the Navy fleet. So you are looking at 2003, 2004 with a program that in the near years would have a lower cost profile than advanced technology, but then in the out years, in terms of the numbers and the nonglamorous operational support costs and the like, the cost would begin to exceed an advanced technology cost curve.

The other way to go is with advanced technology. It is here today. The idea is that the tilt rotor opens up a whole new horizon of operational capability. You alluded to the effort in Somalia in your opening comments to us today. You have talked to some of these warriors. We had the young captain and the crew chief who led the first aircraft into Somalia. They flew 450 miles at night at sea with inadequate navigation equipment, refueled twice with Marine Reserve C–130 aircraft and used the first C–130 as a pathfinder. They somehow got to Somalia within a minute of the time they were supposed to get there. Then 62 commando marines went immediately to the Embassy which was already being overrun and ladders thrown on top of the walls and being shot at, and brought back 63 Americans, including a baby, to safety. They flew back 350 miles at night, because the ships were closing. You could have done that with a tilt rotor type capability with almost instant type of response.

Earlier when we went to Liberia, we had to take a couple of conventional helicopters and put them on a destroyer and race ahead to get to Liberia in time to provide the support that was asked for.

There is a whole range of additional operational capabilities that would be accrued in the special operations community and elsewhere. It is my view a superb candidate for a future antisubmarine warfare platform, because you have got to be able to get out and pick up a buoy recharger, put it in and move off another 200 or 300 miles.

We know that there is interest in the law enforcement communities for drug enforcement, drug ops-type counternarcotic type operations and other operations within this country. We are aware of several countries that have demonstrated interest in offshore oil wells. It gives us the capability to come from further over the horizon, to go where they are not, to get behind the enemy, and to disrupt lines of communications, and a host of other ideas.

So the advanced technology certainly should be looked at in its full potential of what it can do for the military and the commercial or private sector. In terms of delivery and the like, you could get the advanced technology capability in my view earlier than the 2003, 2004 time frame. We are fully prepared to build the preproduction models. We have been flying the R&D model as you know. My own estimate would be that by 1996, you could introduce tilt rotor type capability, the V–22, into the training squadrons and within 2 years from that point you would have them within the fleet Marine force and in the Naval fleet your capability.

So we have to look I think at all of these things, the short-term cost, the long-term cost, the significant difference in operational ca-

pability, and all that it means, and hopefully come up with the choice that is best for the Nation.

Senator KENNEDY. I think we know what your answer would be. We want to thank you once again. It has been a great pleasure. We value very much your testimony here today, and we appreciate all of your service.

General GRAY. Thank you, sir.

[Questions for the record with answers supplied follow:]

QUESTION SUBMITTED BY SENATOR WILLIAM S. COHEN

M60E3 VERSUS M240 MACHINE GUN

Senator COHEN. I understand that the Marine Corps is considering acquiring excess M240 machine guns from the Army with plans to use the M240 as a replacement for the M60E3 in the infantry role.

Information I have been provided on these weapons indicates that the M60E3 weights less than 19 pounds and is 42 inches long; while the M240 weighs 26 pounds and is 52 inches long; also that ammunition may have to be re-linked and other modifications made to the M240 to adapt if from a coaxial weapon to an infantry, man-portable version.

This is a real surprise since I thought we were trying to reduce the weight carried by the infantry even if we had to spend money to lighten the load.

Please describe your plans for this weapon, for the record.

General GRAY. The USMC has already transitioned from the M60E2 and the M60D to the M240 and M240E1 (Vehicular configurations).

The USMC is currently transitioning from the M60E3 to the M240G (Ground Configuration). The two major reasons for this are:

1. Commonality of medium machine guns across the USMC. Currently, the tank and LAV communities both employ the M240 and M240E1 as their vehicle mounted medium machine guns.

2. The M240 has proven to be a far superior machine gun in terms of reliability, availability, and maintainability. This is derived from extensive firing tests conducted at Dahlgren and Aberdeen Proving Grounds, as well as several years of operational experience. Dahlgren reports show mean rounds between failure (MRBF) as 2,800 for the M60E3 and 15,900 for the M240. Aberdeen's ratio is even higher in favor of the M240. In addition, repair usage data from the Rock Island Arsenal and MCLB, Albany show that the M240 is more reliable, more economical to maintain, and will enjoy a life cycle cost one-third that of the M60E3.

The M60E3HB (new product improved version) would have improved the capability of the base-line M60E3. The barrel configuration would have enabled the operator to enjoy the traditional rates of fire associated with the M60 family of weapon systems. However, the operating group on the M60E3HB would have remained unchanged. Therefore, we still believe the M60E3HB will continue to exhibit reliability problems far in excess of the M240G.

An operational evaluation will take place in July/August 1991. The test will be conducted throughout the USMC and will include both the M240G and the M60E3HB. The tests will be the same for both weapons.

Weight and Length Issue

Weight: It is true that the current M60E3 weighs 18.5 lbs. However, the light weight of the M60E3 presented several intolerable deficiencies. These deficiencies were corrected only after adding 3 additional pounds, an acceptable tradeoff for improved performance. The new heavier weapon is the M60E3HB and weighs 21.5 lbs. The M240 weighs 24.5 lbs. However, this is still within a pound of the original M60 machine gun (23.5 lbs.). The most germane comparison must then be between the M60E3HB and the M240, a difference of 3 lbs., or a 14 percent increase. This degree of increase does not represent an operational deficiency.

Length: There are several different ways to measure a weapon. Two pertinent methods are as follows:

Method	M240G	M60E3HB
End-To-End	49.6 inches	42.4 inches
Operational	49.6 inches	46.3 inches

The operational comparison therefore, is 49.6 inches for the M240 and 46.3 for the M60E3HB with extended shoulder rest, a difference of only 9 percent. This degree of increase does not represent an operational deficiency.

Ammunition issue: No issue. Current 7.62mm linked ammo is totally interoperable between the M60 and the M240.

Modification issue:

M60E3 to M60E3HB conversion program cost: $16.9 million.

M240 to M240G conversion program cost: $9.9 million.

The significant difference in cost, which makes the M240 the more economical decision, is that the M60E3/M60E3HB conversion requires the procurement of heavy weight barrels at $750/barrel. Other program comparisons are of equal costs or impact.

QUESTIONS SUBMITTED BY SENATOR JOHN MCCAIN

AMPHIBIOUS SHIPS

Senator MCCAIN. How many amphibious ships does the Navy now plan to phase out of its force structure? What types will phase out each year? How important is this to the Corps' amphibious lift capability?

General GRAY. Between now and October 1, 1997 the Navy plans to phase out 24 amphibious ships as indicated in the following table:

	Fiscal year					
	1992	1993	1994*	1995	1996	1997
LPD					1	1
LSD	1	1				
LST	1	1	1	1		
LPH			1	1	1	1

These retirements, prior to the end of the ships' nominal 35 year service lives, represent a significant reduction not only in aggregate lift, but also in the number of ships available for forward presence and contingency response. The retirements conform to a *lift goal of 2.5 Marine Expeditionary Brigades (MEBs)*. This force reduction will result in the inability to respond simultaneously with a MEB in two oceans while maintaining three forward presence ready groups elsewhere in the world.

MARITIME PREPOSITIONING SHIPS

Senator MCCAIN. What would a 4th MPS ship be used for? When is it needed? What would it cost?

General GRAY. At the direction of the Secretary of the Navy, the Commandant of the Marine Corps and the Chief of Naval Operations have begun an analysis of the utility of a fourth Maritime Prepositioning Ship (MPS) Squadron. The results of this analysis are due to the Secretary prior to the conclusion of the DON fiscal year 1993 Program Review.

Initial indications from the aforementioned study suggest that a fourth MPS Squadron would enhance current capabilities as well as expand the range of employment options. Historically, most naval deployments have been to four theaters: the Caribbean, Mediterranean, Arabian Sea, and the Western Pacific. Expanding to four MPS Squadrons would allow dedicating a MPF to each theater, resulting in a reduced ready-to-operate time in the most-likely theaters of operations.

This fourth squadron would possess the ability to employ portions of a complete squadron, or force modules, in low and mid-intensity conflicts as well as the complete MPF MEB.

Costs for an additional squadron are outlined below using fiscal year 1990 dollars:

- $235–$250 million construction cost per ship (a fourth squadron would require either 4 or 5 ships, depending on the type of ship)
- $53 million one time cost for Naval Support Equipment/Lighterage (required to support cargo discharge operations)
- $12 million per ship per year for ship operation/maintenance
- $.7 million per ship in the maintenance cycle for lighterage maintenance (average of 4.5 ships per year)
- Approximately $500 million one time cost to purchase ground equipment and supplies (does not include costs associated with Aviation Ground Support Equipment (AGSE), Class V(A) and Class III bulk)
- $1.5 million per year for exercise support.

Senator McCain. What is the current plan to cut active Marine Corps forces in terms of men and units per year?

General Gray. The Marine Corps programmed end strength from fiscal year 1991 through fiscal year 1993 is as follows: Fiscal year 1991—193,735, fiscal year 1992—188,000, fiscal year 1993—182,200. The following chart presents the specific reductions planned for the budget years. Cuts have been organized horizontally into the four elements of our Marine Air Ground Task Force or MAGTF organization. We show the cuts over 3 years, commencing in fiscal year 1991 and the 2 budget years which follow.

In the command element we have taken a 10 percent force headquarters reduction, and in 1993 will take horizontal reductions in our SRIG or Surveillance, Reconnaissance and Intelligence Groups.

In the Ground Combat Element, we have deactivated three rifle battalions and removed the 4th Rifle Company from the eight battalions in the MEU(SOC) forward deployment cycle. We are also eliminating the truck company from each Marine division. Our major reductions are in 1992 when we plan to eliminate one artillery battalion, one armored assault battalion, one tank battalion, and one regimental headquarters company. In 1993 we will substantially reduce a division headquarters battalion on Okinawa.

From our aviation assets we have already cut one Light Anti-Air Missile Battalion, in fiscal year 1992 we will eliminate a minor unit called the Marine Wing Weapons Units. At this point in time we also propose to deactivate two F/A–18 Fighter Attack Squadrons.

Our combat service support assets are currently sized to provide balanced support to the MAGTF. As the MAGTF reduces, in terms of structure and manning, our combat service support assets will also be reduced. The equivalent of 15 or more companies will be reduced from fiscal year 1991 to fiscal year 1993.

In all, our three MEFs will sustain a loss of 8,000 marines as we move from an end strength of almost 194,000 to 182,000.

Tentative Fleet Marine Force Reductions

	1991	1992	1993
COMMAND ELEMENT	Force Hdqtrs Reduction		SRIG [1] (C²I) [2] Cuts
GROUND COMBAT ELEMENT	Deact 3 Rifle Bns Rifle Co's—8 Truck Co's—3	Arty Bn Armd Asl Bn [3] Tank Bn—Regt Hdqtrs	1608's Mar/Div
AVIATION COMBAT ELEMENT	LAAM BN [4]	MWWU [5] F/A-18 Sqdn—2	
COMBAT SERVICE SUPPORT ELEMENT	Horizontal Reductions	Horizontal Reductions	Horizontal Reductions

[1] SRIG—Surveillance, Reconnaissance, Intelligence Group
[2] C²I—Command, Control, and Communication
[3] Armd Asl Bn—Armored Assault Battalion
[4] LAAM Bn—Light Anti-Air Missile Battalion
[5] MWWU—Marine Wing Weapons Unit

Senator McCain. What additional funding would be needed each year to keep the Corps at three active MEFs?

General GRAY. To creditably man three active MEFs, the Marine Corps end strength must remain at 182,200.

Additional Funding to Maintain 3 MEFs

[Dollars in millions]

	Fiscal years					
	1997	1998	1994	1995	1996	1997
MPMC	$0	$0	$165.8	$432.6	$659.8	$917.5
O&MMC	0	0	15.9	41.1	63.7	92.9

Senator MCCAIN. What would it cost to reconstitute such forces from scratch?

General GRAY. a. Reconstitution occurs due to a national crisis.

b. 182,200 personnel mans three active MEFs.

c. Reconstitution would be from 159,100 (fiscal year 1997) to 182,200.

d. Reconstitution is accomplished over 2 years at 11,550 personnel per year.

e. "From scratch" interpreted as starting officers and enlisted at the entry level.

f. Costs do not include the purchase of additional principal end items (PEIs), additional maintenance of equipment, PCS costs, and increased recruiting and training costs.

Number of Officers—fiscal year 1997, 16,235; fiscal year 1998, 17,413; fiscal year 1999, 18,591.

	Millions
Officer Acqn. Training (OCS) for 1,178 Officers (fiscal year 1998)	$19.9
OCS for 1,178 Officers (fiscal year 1999)	20.6
TBS for 1,178 Officers (fiscal year 1998)	59.0
TBS for 1,178 Officers (fiscal year 1999)	61.0
Specialized Officer Training for 1,178 Officers (fiscal year 1998)	27.0
Specialized Officer Training for 1,178 Officers (fiscal year 1999)	28.0
Officer Pay & Allow. (fiscal year 1999) for 1,178 Officers	46.0
Officer Retirement for 1,178 Officers (fiscal year 1998)	12.5
Officer Retirement for 2,356 Officers (fiscal year 1999)	26.0
Officer O&M Spt. for 1,178 Officers (fiscal year 1998)	1.9
Officer O&M Spt. for 2,356 Officers (fiscal year 1999)	4.0
Total	$305.9

Enlisted personnel—fiscal year 1997, 142,865; fiscal year 1998, 153,237; fiscal year 1999, 163,609.

	Millions
Recruit Training for 10,372 Enlisted Marines (fiscal year 1998)	202.0
Recruit Training for 10,372 Enlisted Marines (fiscal year 1999)	209.0
Marine Combat Training for 10,372 Marines (fiscal year 1998)	78.9
Marine Combat Training for 10,372 Marines (fiscal year 1999)	81.8
Specialized Enlisted Training for 10,372 Marines (fiscal year 1998)	70.4
Specialized Enlisted Training for 10,372 Marines (fiscal year 1999)	73.0
Enlisted Pay & Allow. (fiscal year 1998) for 10,372 Marines (30 weeks)	118.0
Enlisted Pay & Allow. (fiscal year 1999) for 20,744 Marines	335.0
Enlisted Retirement (fiscal year 1998) for 10,372 Marines	59.7
Enlisted Retirement (fiscal year 1999) for 20,744 Marines	123.9
Enlisted O&M Spt. for 10,372 Marines (fiscal year 1998)	17.7
Enlisted O&M Spt. for 20,744 Marines (fiscal year 1999)	36.7
Total	$1,406.1

AMPHIBIOUS FORCES

Senator MCCAIN. Exactly what problems does the Corps have with block obsolescence of amphibious forces in the mid 1990s and beyond? What is needed to correct this situation? What would it cost?

General GRAY. Based on a nominal ship service life of 35 years, block obsolescence would not occur in the amphibious fleet until the turn of the century. The impact of proposed early retirement of amphibious ships as part of a force reduction program, however, is to shift block obsolescence to the left. Eighty percent of today's amphibi-

ous ships will retire by 2007. Timely replacement of this national capability will be required as well as prudent management of existing lift.

Senator McCain. What major steps does the Corps want to take to improve its forces and capabilities as a result of the Gulf war? What is needed to correct this situation? What would it cost?

General Gray. Our service planning documents, particularly the MAGTF Master Plan, focus our combat development on the most likely military operations we expect to face in the future-Third World regional conflict. The war in SWA reinforced this primary focus. We are carefully analyzing every aspect of our operations in the Gulf to ensure that our capability development continues on track. Every effort must be made to preserve the global response capability which requires an end strength of 182K and limited modernization of our strategic and tactical mobility assets to include amphibious ships, Medium Lift Replacement, and the Advanced Assault Amphibian programs.

V–22

Senator McCain. What is the current procurement schedule and cost of the V–22 program desired by the Corps? What is the total program cost? Has the Corps refined its requirement for the V–22 since last August?

General Gray. The V–22 program was officially canceled by Department of Defense in 1989. The Department of the Navy is presently executing an FSD contract. The total program cost for FSD is $2.8 billion, of which $360 million remains to be expended.

The Marine Corps requirement for a medium lift replacement aircraft has not changed. Prior to cancellation, the V–22 was the selected alternative. The Department of the Navy requirement was for 602 aircraft, of which 552 aircraft were for the Marine Corps.

Senator McCain. What steps, if any, does the Corps intend to take to improve its MIC and HIC capabilities as a result of Desert Storm? How heavy will the MEF of the mid and late 1990s be?

General Gray. The Marine Corps is currently focused on improving its capabilities for conflict in the Third World. We have seen that this environment demands capabilities that encompass the entire spectrum of conflict. In this regard, Desert Storm has reinforced many of our force development conclusions. Therefore, our first step is to complete the detailed analysis of our operations in the Gulf and lessons learned by July 1, 1991.

Future MEFs will continue to be light enough to deploy and heavy enough to win. The Fleet Marine Forces, as well as the entire Marine Corps, represents a pool of assets from which a MEF commander can draw to meet mission demands. Our basic goal has always been to provide the Nation with flexible, responsive, expeditionary Marine forces for employment across the spectrum of conflict. This means that in the future, just like in Desert Storm, we will be able to quickly deploy a task organized, balanced force with the right mix of capabilities to get the job done.

Senator McCain. What readiness and sustainability problems is the Corps encountering as a result of current force cuts? What funding and actions are necessary to correct them?

General Gray. The Marine Corps is requesting active duty end strengths of 188,000 and 182,200 for fiscal years 1992 and 1993 respectively. These strengths not only support our operational requirements but are also realistic in the sense that they are achievable without excessive or capricious manpower actions. However for fiscal year 1994 and beyond, the Marine Corps has had to do some serious belt-tightening to cope with severe fiscal constraints. Current Department of Defense planning calls for continued active duty strength reductions of approximately 5,800 marines per year in fiscal years 1994 through 1997. Fiscal constraints would have called for even steeper strength reductions, but our manpower plans for fiscal year 1994 and beyond incorporate "least cost" alternatives to keep the cost of manpower as inexpensive as possible. The primary cost-saving features include early-release programs and unleveled accessions. Early-release programs produce turbulence and degrade unit readiness and unleveled accessions cause serious training inefficiencies. These undesirable actions are necessary to remain within fiscal controls while maintaining an end strength profile that supports our operational requirements. I am deeply concerned that with end strengths below 182,200, the Marine Corps will not have the kind of capabilities that our Nation has come to expect—a versatile, responsive, combined arms capable Marine Corps which is balanced, self-sustaining, and able to respond rapidly to conflicts anywhere in the world. The emerging military strategy places greater emphasis on contingency forces for regional conflict. It

makes little sense to reduce Marine Corps forces which have the requisite capabilities today, only to have to create similar forces in the future.

Senator McCain. Looking towards the year 2010, what steps need to be taken now to ensure the mission capability of Marine Corps tactical aviation? What is their estimated cost for fiscal years 1992–1996? Total program cost?

General Gray. Headquarters Marine Corps Department of Aviation publishes an annual Aviation Plan which delineates Marine Aviation objectives for a period of 10 years. This document reflects the combined input of Marine Corps requirements developed at Quantico, Virginia, guidance contained within the Department of the Navy Integrated Amphibious Operations and USMC Air Support Requirements Study, dated April 9, 1990 and the realities of manpower and fiscal constraints within OSD. Across the FYDP, Marine Aviation will purchase aircraft at required inventory levels. However, in some airframes, the total procured will fall short of the total procurement objective, which includes 20 year peacetime attrition. Aircraft shortfalls amount to 24 AH–1Ws, 18 CH–53s, and 47 AV–8Bs. The total cost to buy out this procurement shortfall is approximately $1.75 billion in constant fiscal year 1991 procurement dollars.

AMPHIBIOUS CAPABILITY

Senator McCain. Could the Marine Corps preserve amphibious capability by shifting ships to reserve, rather than retiring them from service?

General Gray. In order to maintain greater lift capability than currently programmed, it may be reasonable to support scenarios requiring mobilization by placing some amphibious ships now scheduled to retire into the reserves or some other reduced operating status. Although the assignment of amphibious ships to the reserves in lieu of retirement could reserve capability, such ships would be less flexible and responsive than active ships.

[Whereupon, at 11:24 a.m., the subcommittee adjourned until further call of the chair.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEARS 1992 AND 1993

FRIDAY, MAY 24, 1991

U.S. SENATE,
SUBCOMMITTEE ON PROJECTION FORCES
AND REGIONAL DEFENSE,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

CURRENT STRATEGIC LIFT CAPABILITY AND PROGRAMS

The subcommittee met, pursuant to notice, at 9:30 a.m., in room SR-222, Russell Senate Office Building, Senator Edward M. Kennedy (chairman of the subcommittee) presiding.

Committee members present: Senators Kennedy, Exon, Dixon, Cohen, and McCain.

Professional staff member present: Creighton Greene.

Minority staff members present: Ronald P. Kelly, Durwood W. Ringo, Jr., and Mark B. Robinson, professional staff members.

Staff assistant present: Julie W. Kemp.

Committee members' assistants present: William J. Lynn, assistant to Senator Kennedy; Andrew W. Johnson, assistant to Senator Exon; and Leon S. Fuerth, assistant to Senator Gore.

OPENING STATEMENT OF EDWARD M. KENNEDY, CHAIRMAN

Senator KENNEDY. We will come to order.

The subcommittee meets this morning to consider the administration's programs to achieve strategic lift goals and to hear about the recent deployment in support of Operations Desert Shield and Desert Storm.

We have just witnessed the largest and most rapid deployment of military power since World War II. The speed of the deployments was instrumental in halting Saddam Hussein from further aggression in August, and the magnitude of the later deployments was critical in ejecting him from Kuwait in February. These achievements were made possible largely because of lift capability added during the past 15 years, including the C-5 aircraft and tankers, maritime prepositioning ships, and expanded Ready Reserve force.

Saddam Hussein's aggression against Kuwait has demonstrated that although the cold war has ended, we still face threats to our vital interests, and we must be prepared. Even though our Armed Forces may not be faced with a threat from front-line Soviet forces, they could very well face front-line Soviet weapons that demand a

quick, effective, and sustained response. Next time, we may not be lucky enough to have an aggressor so inept to employ the high-tech weapons.

This morning we will focus on what the administration has been doing to respond to the demands for adequate lift capability. The committee has been concerned with the adequacy of this capability for some time.

At this subcommittee's initiative, the Department of Defense undertook a fundamental review of the requirements for strategic lift capability and options for improving it. The analysis, called the Mobility Requirements Study (MRS), has produced an interim report that we will hear about this morning. That report details only the sealift portion of the issue. This subcommittee has long supported improving our fast sealift capability. Over the past several years we have supported procuring additional fast sealift ships and exploring new fast sealift technologies.

We will also want to explore the other parts of the mobility equation—airlift, amphibious lift, and prepositioning. We are particularly interested in hearing about the restructuring of the C–17 program that resulted from last year's congressional decision to slow the program down.

The subcommittee will hear from three witnesses this morning: Gen. Hansford Johnson, Commander in Chief, U.S. Transportation Command; Capt. Warren Leback, Administrator of the Maritime Administration; and Vice Adm. Stephen Loftus, Deputy Chief of Naval Operations for Logistics.

I welcome all of our witnesses and look forward to their testimony. We will ask General Johnson if he would be good enough to start out.

[The prepared statement of Senator Kennedy follows:]

PREPARED STATEMENT BY SENATOR EDWARD M. KENNEDY

The subcommittee meets this morning to consider the administration's programs to achieve strategic lift goals and to hear about the recent deployment in support of Operations Desert Shield and Desert Storm.

We have just witnessed the largest and most rapid deployment of military power since World War II. The speed of the deployments was instrumental in halting Saddam from further aggression in August and the magnitude of the later deployments was critical to ejecting him from Kuwait in February.

These achievements were made possible largely because of the lift capability added during the past 15 years, including C–5 aircraft and tankers, Maritime Prepositioning Ships, and an expanded Ready Reserve Force.

Saddam Hussein's aggression against Kuwait has demonstrated that although the cold war has ended, we still face threats to our vital interests, and we must be prepared. Even though our Armed Forces may not be faced with a threat from front-line Soviet forces, they could very well face front-line Soviet weapons that demand a quick, effective, and sustained response. Next time, we may not be lucky enough to have an aggressor so ineptly employ his high-tech weapons.

This morning we will focus on what the administration has been doing to respond to the demands for adequate lift capability. The committee has been concerned with the adequacy of this capability for some time.

At this subcommittee's initiative, the Department of Defense undertook a fundamental review of the requirements for strategic lift capability and options for improving it. This analysis, called the Mobility Requirements Study, has produced an interim report that we will hear about this morning. That report deals only with the sealift portion of the issue. This subcommittee has long supported improving our fast sealift capability. Over the past several years, we have supported procuring additional fast sealift ships and exploring new fast sealift technologies.

We will also want to explore the other parts of the mobility equation—airlift, amphibious lift, and prepositioning. We are particularly interested in hearing about the restructuring of the C-17 program that resulted from last year's congressional decision to slow the program down.

The subcommittee will hear from three witnesses this morning:

— Gen. Hansford T. Johnson, Commander in Chief, U.S. Transportation Command;

— Capt. Warren Leback, Administrator of the Maritime Administration; and

— Vice Adm. Stephen F. Loftus, Deputy Chief of Naval Operations (Logistics).

I welcome our witnesses, and I look forward to their testimony.

Senator COHEN. Mr. Chairman?

Senator KENNEDY. Oh, excuse me.

Senator COHEN. I just want to say a couple of words.

Mr. Chairman, I join you in welcoming the three witnesses. All three performed admirably during the Desert Shield and Desert Storm operations as such, but I think that our Commander in Chief of the Transportation Command deserves special recognition. I know that transportation and logistics are not exactly the most exciting part of the war effort, but nonetheless, it is perhaps more important than most people realize.

I would like to focus principally on three issues for the three of our witnesses.

Number one, sealift. The Department of Defense has, as I recall, $1.2 billion already appropriated for procurement of additional sealift. When are we going to see the ships in the procurement line come forward?

Number two, personnel. The size of the U.S.-Flag Merchant Marine is steadily declining, and I would like to know where are we going to get the skilled civilian mariners we are going to need in the future.

Number three, I would like you to focus upon the funding for the Ready Reserve Forces. There were some problems in the call-up on the RRF ships. We had not exercised this capability adequately in the past. And changing that requires some money, and I think we ought to know whether or not we can do something different in the future for the RRF.

So, along with other issues like the C-17, I would like to take these three issues for my own personal line of inquiry.

Senator KENNEDY. Very good. All right, General Johnson?

STATEMENT OF GEN. HANSFORD T. JOHNSON, U.S. AIR FORCE, COMMANDER IN CHIEF, U.S. TRANSPORTATION COMMAND

General JOHNSON. I am pleased to join Mr. Leback and Admiral Loftus.

Certainly it has been a team effort in everything that we have done. Our country has never moved so much so far so fast. I have provided a statement for the record that gives a good historical perspective. The results certainly involved total force, as I define it, the Active, the Reserve, the Guard, and also the commercial sector in our business of transportation. We rely heavily on the commercial sector, the rail, trucking, airline, and shipping industries, along with the union's port authorities, and all of these worked very, very well together. We were able to build the Transportation Command's role as a coordinator of this effort, and I believe that the fundamental concepts have been validated for this command.

We provided a single managership for the transportation system and again there was a spirit of partnership not only between the public and private sectors, but I also have to say, within the Department of Defense and Department of Transportation. The cooperation has been tremendous. I could not have asked for better. This unified approach is certainly the most economical way to provide transportation rather than having all organic, and it requires a very close partnership between the people sitting at the table and many of the others represented in the room.

On sealift, this subcommittee over the years has very strongly supported our afloat prepositioning and maritime prepositioning programs. Those worked very, very well. The first maritime preposition ship arrived 8 days after the hostilities began. We were able to airlift the troops to meet those ships, and they became combat effective almost immediately. The fast sealift ships that this committee played a big role in acquiring were activated directly and moved 9,000 miles in 14 days from Savannah to the Persian Gulf.

Senator COHEN. General, when you say after hostilities began, do you mean in August?

General JOHNSON. August 7, yes, sir. That's when the sail order was given.

With the Ready Reserve Force under Mr. Leback, we activated 78 ships during the conflict. We had difficulties activating those and, Senator Cohen, some of the things you want to talk about later are those difficulties, and we will be glad to answer questions. Once they were activated, those old ships operated at 94 percent reliability. That is a great kudos to not only the Maritime Administration, but more importantly to the members of the unions, and so forth that operated those ships. We learned we needed more of the roll-on/roll-off ships, and I am sure that will come up this morning.

The airlift system worked very well. The organic fleet flew well. The C-141s, as we talked about last year, still have fatigue problems with their wings. We took some risk, but we were not in any way inhibited by those wing problems, although it will be a problem in the future.

CRAF, the Civil Reserve Air Fleet, was activated for the first time, and I might say that we deactivated the last part today. So, we have deactivated all the CRAF as of today. That effort worked very well. The only area of improvement we need in airlift is to continue the strong support of this committee for the C-17.

We do not talk about the surface transportation nearly enough. We take it for granted. Our commercial sector supported Desert Shield and Desert Storm with 16,000 rail cars and over 28,000 trucks. The ports loaded nearly 700 football fields covered with cargo. That industry does well. Certainly as Americans and as transportation members, we need to continue to work on our roads and bridges, but the surface community is very strong. As we prepare for the 1990s, we need to continue to maintain a well-balanced program between the lifts, surface, air, and sea, but also prepositioning. When we start talking about moving overseas, it is a triad of sealift, airlift, and prepositioning that gets the job done. My command is not directly involved in prepositioning, but certainly we are strong advocates for that program.

As we look at Desert Shield and Desert Storm, we have to remember that many things were in our favor. First, we did not have to fight our way in. We enjoyed tremendous international cooperation. In the lift business, we never asked for any overflights or passage rights that we did not get. The theater port infrastructure in Saudi Arabia and the other countries was very good. The best ports in the world, air, and sea. We also have to realize that we operated in a very benign and cooperative environment. We did not have attacks at sea. Admiral Loftus in the Navy could take protection for granted without providing a great many resources.

Desert Shield and Desert Storm has been my command's first major test, but it also was a major test of our Nation's transportation community. I am proud to report that we had an unqualified success. We have certainly learned a great deal, and throughout the conflict, we were able to put those lessons into practice. We were able to fix things and continue to provide a more efficient transportation system for our great Nation.

Thank you, sir.

[The prepared statement of General Johnson follows:]

PREPARED STATEMENT OF GEN. HAROLD J. JOHNSON, COMMANDER IN CHIEF, U.S. TRANSPORTATION COMMAND

Mr. Chairman and distinguished members of the subcommittee, I am pleased to appear before you today, representing the men and women of the U.S. Transportation Command (USTRANSCOM) and its component commands: the Military Airlift Command (MAC), the Military Sealift Command (MSC), and the Military Traffic Management Command (MTMC). We are very proud of our involvement in the most intensive military deployment in U.S. history. Along with an overwhelming response from our National Guard and Reserve forces, the civilian transportation industry and allied and friendly foreign governments, we set a new standard for force projection in Operations Desert Shield/Storm, transporting more than half a million people and nearly 10 million tons of materiel in support of U.S. military operations over a 7 month period.

THE TRANSPORTATION SYSTEM EVOLUTION

The defense transportation system which made this massive effort possible has evolved steadily throughout U.S. military history, with each mobilization providing new insights and opportunities for improvement. In many ways USTRANSCOM is a product of that evolutionary process. We have learned through experience that the most effective and efficient defense transportation structure employs centralized planning, supervision, and integration of mobility assets with decentralized execution by component experts, military and civilian, most familiar with their particular mode of transportation. The system should be capable of seamless integration of these modes of transportation—land, air, and sea—and would provide comprehensive in-transit visibility of cargo and troops from home base to final destination. This vision of the perfect mobility system has evolved over nearly 100 years of U.S. military experience in mobilization, beginning with the Spanish-American War.

THE SPANISH-AMERICAN WAR

The Spanish-American War marked the first major mobilization of U.S. Armed Forces for an overseas conflict. Although the war lasted only 10 weeks, from April 25 to July 17, 1898, our inability to effectively mobilize and transport troops and equipment nearly proved disastrous.

The root of transportation difficulties during the Spanish-American War was a lack of precise planning. Hastily drawn-up plans were constantly changed, with little or no consideration given to their transportation feasibility. The resulting inability to match the flow of materiel into the ports with the capability to move it out nearly paralyzed the mobilization effort. For example, the port of Tampa was chosen as the embarkation point for the campaign to Cuba. Originally planned to handle 5,000 troops, changes quickly drove that number to 25,000. A lack of cargo documentation and inadequate unloading and warehousing facilities caused move-

ment of materiel through the port to quickly grind to a halt. Approximately 1,000 rail cars were backed up on sidings from Tampa to as far away as Columbia, South Carolina. Exacerbating this backlog was the Army's inability to acquire adequate U.S. flag ocean-going vessels and lack of experience in ocean transportation. Due to insufficient shipbuilding facilities, the U.S. Government was forced to procure sealift from foreign sources.

Although we won the war against Spain, the process used to mobilize and transport U.S. troops for the expedition to Cuba was clearly inadequate. Unfortunately, the war was over so quickly the Army found little opportunity to improve its methods for mobilization and logistical support. We were destined to relive, on a much larger scale, many of the same problems as we mobilized for World War I.

WORLD WAR I

Even though nearly 3 years had elapsed between the time hostilities began in Europe in 1914 and the time the United States declared war on Germany in 1917, the United States did very little to prepare for a major overseas conflict. Consequently, when the time came to mobilize, the United States faced an enormous challenge.

The broad strategy of American military involvement in World War I was simply to pour as many U.S. troops into France as available sealift would allow. As mobilization pressures quickly mounted, the Federal Government took the unprecedented step of exercising complete control over every important aspect of the Nation's economy. The railroads were nationalized, strict controls were imposed on industry, food and fuel was rationed, and coercive measures were employed to prevent strikes. While these measures dramatically increased our Nation's output of war materiel, as in the war against Spain, initially there was no central coordination of the massive volume of men and materiel moving by rail to the embarkation ports. Once again this lack of centralized control resulted in clogged terminals and ports. It took as long as 2 weeks to process a single train through the terminal at Pittsburgh while as many as 200 ships lay at anchor in New York harbor awaiting cargo and fuel. Delays such as these resulted in an estimated 2 million tons (44,320 car loads) of freight being stalled along the Atlantic coast and as far west as the Missouri River.

The most limiting factor in this deployment, however, was the uncertain availability of sealift. Overall, the U.S. flag fleet was woefully inadequate to the task of moving more than 2 million troops and their supplies to Europe. At the same time, allied and neutral shipping was experiencing devastating attrition by German submarines, losing 17 million dead weight tons (DWT) of capacity by the time America entered the war in 1917. Thus, by competing for a declining sealift resource, U.S. involvement placed further strain on an already overtaxed neutral and allied fleet.

World War I highlighted the need for unification within each mode and coordination between all modes of transportation when mobilizing. As with the war against Spain, World War I showed how easily ports and terminals can become blocked when the flow of materiel coming in is not coordinated with the capability to move it out, and again demonstrated the impact of limited sealift capability. Fortunately, most of the lessons learned in World War I were remembered and applied to the early stages of our involvement in World War II.

WORLD WAR II

In World War II, the United States faced some of the most difficult domestic transportation problems our country had ever seen. While the volume of wartime freight traffic was higher than ever before, maintenance, operation, and expansion of the transportation system was hampered by shortages of manpower and vital materials. Despite these challenges, the Nation's transportation system functioned well during World War II. Certainly the system was strained, but constant supervision and coordination by numerous Federal agencies kept traffic flowing steadily if not swiftly.

World War II marked the first large scale use of airlift to support theater combat operations, but airlift played a minimal role in stateside mobilization and strategic lift. Once again the availability of sealift set the pace for mobilization, with military campaigns frequently delayed because of a lack of merchant shipping. Regardless of how many troops were mobilized, how much food, clothing, and weaponry the economy could produce, or how much the railroads could deliver to the ports of embarkation, it was primarily the availability of sealift that determined how many troops and how much of their equipment could be sent to the theaters of war.

An essential lesson learned during World War II was that the Federal Government did not have to actually take possession of transportation modes to achieve intermodal and intramodal coordination. Instead, the government left the operation of the transportation system in the hands of private management while exercising supervisory control. The key to efficient and effective operation of the domestic transportation system became centralized control with decentralized execution—a system used effectively during the Korean conflict.

KOREA

The United States faced two logistical crises during the Korean conflict. The first involved moving enough supplies and equipment to sustain the forces sent to blunt the initial North Korean offensive. The second involved the reconstitution of reserve stocks and continued reinforcement of United Nations (U.N.) forces. Unlike the previous two wars, at no time was the American economy placed on a full wartime footing. Instead, the government adopted the notion of "creeping mobilization," increasing production without greatly disturbing the normal peacetime economy.

During the initial campaign to block the North Korean advance, attempts to resupply U.N. forces from the United States were not particularly successful. The shipping time was too long and the tactical situation was changing too rapidly for sealift to meet demands, while the airlift system lacked the capacity to move anything but the highest priority cargo. Japan, therefore, became the major supply point for shipments to Korea. During this initial period of the war, shipping was nearly chaotic. While a shortage of sealift ships forced the activation of the National Defense Reserve Fleet (NDRF), ships moving from Japan and the United States jammed Korea's harbors, creating delays. With no discipline in the system, unnecessary cargo was often delivered while critical items waited to be unloaded. As a result, available shipping was inefficiently utilized. After these first few confusing months of the war, the Military Sea Transportation Service (now the Military Sealift Command) proceeded to get the sealift operation for all military departments running smoothly. Similar efforts were undertaken by the Military Air Transport Service (now the Military Airlift Command) to coordinate the airlift flow.

In dealing with the second logistical crisis, the reconstitution of reserve stocks, two important new developments occurred in sealift. One was MARINEX, a marine express service for shipping high priority cargo when air transportation was unavailable. The second major development was CONEX, a container express service which saved 25 to 30 days in the time required to ship materiel from depot to depot.

VIETNAM

As with the Korean conflict, Vietnam was viewed by the United States as a limited conflict. The employment of creeping mobilization and the protracted nature of the war greatly complicated the transportation effort. Quantities of supplies, equipment, and munitions far exceeded those required by comparable forces in previous wars while build-ups were often not anticipated and, when they were, only limited, timely action was allowed so as to not compromise security.

Vietnam saw the first large scale use of strategic airlift, as the U.S. moved into the jet age with the debut of the C–141 and C–5 aircraft. These large, specially designed airlifters were able to make the round trip from the west coast to Southeast Asia in less than half the time of previous aircraft like the C–124, greatly increasing the effectiveness of airlift operations. Several innovations such as prepositioning aircrews to reduce aircraft ground times, automated aerial ports and cargo priority systems, and implementation of the "Red Ball Express," which guaranteed shipment within 24 hours of receipt, further enhanced airlift throughput. Even with these advances, however, we were forced to charter additional airlift from the commercial sector.

Once again, the availability of sealift became the limiting factor in transporting materiel to Vietnam. With requirements quickly exceeding capability and the usual practice of requisitioning ships not available due to the limited nature of the conflict, the Navy was forced to turn to activation of the NDRF and charter of U.S. and foreign flag vessels. Looking for innovative ways to alleviate the shortage of amphibious lift, the Secretary of Defense, in 1963, proposed the concept of a floating forward depot. This concept called for NDRF ships to be loaded with Marine equipment and prepositioned near the theater. When needed, the troops would be airlifted in from Hawaii to marry-up with their equipment and quickly become combat ready. Top naval leaders were unenthusiastic about immobilizing scarce sealift ships that would require secure ports in which to off-load cargo, so the floating forward depot concept never took hold.

TRANSPORTATION IN THE 1980S

All of these wartime mobilization experiences point to the critical need for sufficient strategic lift. For decades, though, we wrestled with the fundamental question of how much lift is enough, conducting 17 major studies between 1974 and 1980 alone! Then, in 1981, the DOD completed the Congressionally Mandated Mobility Study (CMMS) and in 1984 completed the DOD Sealift Study. The results of these studies became the benchmark against which our transportation capability was measured; and that capability was found to be lacking. In large part due to the mobility requirements established by these studies, we were able to build the robust, responsive, and flexible transportation system which worked so well in Operations Desert Shield/Storm.

The 1980s saw the expansion of our organic sealift capability with the acquisition of eight Fast Sealift Ships, the development of our Maritime and Afloat Prepositioning programs, and a rapid expansion of the Ready Reserve Force (RRF). For airlift we expanded our outsize cargo capability by modifying the wings on our C–5As and acquiring the updated C–5B. We extended the capability of our C–141 fleet through the completion of a fuselage stretch program and began in earnest the acquisition of the next generation airlifter, the C–17. Finally, continuing the evolutionary process, USTRANSCOM was established in 1987 to improve mobilization planning and oversee the military transportation system.

Through their planning process, the theater Commanders in Chief (CINCs) determine the movement requirements for their area contingency plans, establishing the size and composition of the forces to be moved, and where and when those forces will be needed. As a supporting command, USTRANSCOM assures the plans are transportation feasible based on this Nation's strategic lift capabilities and then stands ready to orchestrate the lift effort. For the first time in history, USTRANSCOM is able to provide the theater CINCs with the centrally coordinated global air, land, and sea transportation they require to meet national security objectives.

CHANGING THREAT—CHANGING STRATEGY

The United States entered the decade of the 1990s facing revolutionary changes in international geopolitics. The end of 40 years of cold war provided unparalleled opportunities for the rise of a new world order. As with all change however, these events portend a period of uncertainty and instability as new forces attempt to shape the strategic landscape.

As the likelihood of direct military confrontation with the Soviet Union decreases, our attention focussed away from a global threat toward regional concerns as the United States strives to preserve access to foreign markets and resources, deter regional aggressors, and promote the regional stability necessary for progress and prosperity. This regional focus will likely tighten the linkage between economics and strategy, both in terms of defining the threat and the extent to which we are willing to commit national resources. Accompanying these changes is the reality of reduced defense budgets. The required force structure draw-downs, restructuring, and reduced overseas presence will all have an impact on our ability to project force and deter aggression.

DESERT SHIELD/STORM—TRANSPORTATION'S FIRST MAJOR CHALLENGE IN THE NEW STRATEGIC ENVIRONMENT

Building on the lessons of the past, USTRANSCOM and our components stepped up to the mobility challenge of Operations Desert Shield/Storm. Unlike previous conflicts, USTRANSCOM was already in existence at the beginning of the crisis and ready to undertake the momentous task of centrally coordinating and supervising the massive movement of troops and materiel to the Persian Gulf region. We had learned the importance of planning, the critical need for the coordination of movements to ports of embarkation with the capability to process and transport materiel through those ports, and the importance of decentralized execution of the transportation modes.

As with the Korean conflict, we faced two logistic challenges in Desert Shield/Storm. The first involved the rapid movement of sufficient combat force to deter Iraq from continuing its invasion into Saūdi Arabia. The second required used to expand that deterrent force into an offensive capability before the United Nations deadline for Iraqi withdrawal. When the President decided on a military option in response to Iraq's invasion of Kuwait on August 2, 1990, a pre-established sequence of events was set in motion. The U.S. Central Command CINC (USCINCCENT), General H. Norman Schwartzkopf, developed his course of action from an existing operational plan and established personnel and materiel priorities. This course of

action resulted in the initial lift requirements for the movement of troops and equipment from dozens of units located throughout the United States to a destination literally halfway around the world. USTRANSCOM's successful integration of available assets resulted in the movement of more personnel and equipment to the Persian Gulf in the first 3 weeks of Desert Shield than the United States transported to Korea during the first 3 months of the Korean conflict.

Many of the mobility programs that you have authorized over the last decade were called upon in the opening days of Desert Shield, and all have proven their validity. In the first 2 weeks of the deployment we had: fully committed our strategic airlift fleet of C–5s and C–141s, sailed prepositioned ships into the area of operations, began chartering an extensive airlift and sealift fleet, and activated the Fast Sealift Ship (FSS), Ready Reserve Force (RRF), and Civil Reserve Air Fleet (CRAF) programs for the first time ever. These initial efforts represented the cornerstone of our ability to move troops and equipment in support of USCINCCENT requirements.

In meeting the initial challenge to move sufficient combat power to deter continued aggression by Iraq, USTRANSCOM's components were required to generate substantial strategic lift capability from a virtual standing start. The impact of this lack of response time might best be quantified by comparing our ability to move USCINCCENT's initial force requirements with that of the subsequent force buildup. It took 12 weeks to move the nearly 1.5 million tons of cargo and 201,000 troops which made up the initial deterrent force. Once fully functioning, our mobility system was capable of expanding that deterrent force to an offensive capability by moving an additional 1.6 million tons and 200,000 troops in only 9 weeks. While we were able to overcome this lack of response time, the 3 additional weeks required to move the initial force package dramatizes the impact of mobilizing from a standing start.

Complicating our efforts to respond rapidly with sufficient mobility resources were uncertain requirements and changing priorities. Similar to the circumstances encountered at the beginning of the Spanish-American War, the operational plan governing a Southwest Asia contingency was not fully developed, and had not been made transportation feasible. Working closely with the U.S. Central Command (USCENTCOM) staff, and employing our indepth experience with automated mobilization support systems, we were able to quickly structure an executable plan that met USCINCCENT's delivery requirements. Further complicating the first few weeks of the deployment were the uncertain intentions of Iraqi forces, forcing USCINCCENT to alter his movement priorities. However, unlike previous mobilizations USTRANSCOM was able to work with our components, the force providers, and USCENTCOM to incorporate these necessary changes into the logistical pipeline, always ensuring the highest priority cargo got to the theater as quickly as possible.

Unlike the global conflicts of World War I and World War II, Desert Shield/Storm was a mobility effort of wartime proportions accomplished on a peacetime economy. The government did not take over major segments of our transportation infrastructure nor was there any major impact on the traveling public. Transportation assets not owned or operated by the government were acquired for use via commercial charter or donated by allied and friendly governments.

Desert Shield was the most intense airlift effort ever undertaken, and the magnitude of airlift requirements quickly exceeded organic and volunteer charter capabilities. As a result, we called up CRAF Stage I on August 18, 1990, marking the first time since the inception of CRAF in 1951 that any portion of the program had been activated. With MAC's organic airlifters and CRAF Stage I, plus additional U.S. and foreign volunteer aircraft, we were able to meet USCINCCENT's passenger and cargo airlift requirements until commencement of Operation Desert Storm and the start of our heavy sustainment effort. At that point, on January 17, 1991, the Secretary of Defense called up CRAF Stage II. While a robust U.S. airline industry and MAC's long-standing relationship with carriers enrolled in the CRAF program allowed us to meet our airlift requirements with little foreign assistance, strong international support allowed us to meet our sealift requirements without requisitioning ships from the U.S. Merchant Marine.

After the initial Desert Shield deployment order, MSC began to immediately charter sealift through the release of a worldwide Request For Proposal (RFP). They first negotiated contracts with all U.S. flag vessels offered for charter which met USCINCCENT transportation requirements. When they exhausted the U.S. merchant ships offered through the RFP, MSC then turned to allied and friendly sources of shipping. As the deployment grew, MSC continued to charter U.S. commercial flag vessels, when available, to meet sealift requirements. Although consideration was given to activating the Sealift Readiness Program (SRP), the lack of

suitable ships in the SRP not already under charter, the negative impact on the industry of removing vessels from trade, and the availability of foreign shipping, led us to decide against activation of this program.

Unlike the early days of the Korean conflict where long distances hampered sealift responsiveness, we were able to employ our most responsive mode of sealift, the prepositioned fleets. Maritime Prepositioning Ships (MPS) completely outfitted two Marine Expeditionary Brigades (MEBs) in less than half the time it would have taken if materiel had to be transported directly from the United States. Capitalizing on our ability to manage intermodal operations, airlift was called upon to support afloat prepositioning assets and marry up troops with their prepositioned equipment. Through the close coordination of more than 260 C–141 equivalent sorties, USTRANSCOM was able to ensure that troops of the 1st and 7th MEBs arrived in the theater 24 to 48 hours prior to their equipment. Unlike past mobilizations, this tightly managed effort ensured Persian Gulf ports were not overwhelmed by troops waiting for their equipment while, at the same time, equipment did not sit idle, clogging limited staging areas waiting for troops to arrive.

DESERT SHIELD/STORM HISTORIC FIRSTS

The successful conclusion of transportation's first response in today's new strategic environment saw the realization of several historic firsts. We activated Stage I and II of the CRAF, integrated gratis foreign cargo airlift into a massive airlift flow, and gained, but never exercised, the authority to charter foreign airlift. Operations Desert Shield/Storm also saw the first-ever employment of the Maritime and Afloat Prepositioning Ships and the large scale breakout and employment of the Ready Reserve Force and Fast Sealift Ships. Our ability to overcome the challenges of this most intensive mobilization in U.S. history is a tribute to the men and women who made it all possible. Their innovation resulted in many improvements to our transportation capability.

While USCINCCENT's time-phased requirements allowed for the vast majority of cargo to arrive in weeks by sea, some priority cargo had to be delivered to the theater in days. To expedite critical cargo MAC established a "Desert Express" air service. Comparable to commercial express services, Desert Express provided overnight delivery for extremely high-priority items and proved so valuable it was expanded to two flights a day. A "European Express" was also created to move equipment out of Europe, where large quantities of spare parts and equipment are stockpiled.

To ensure a smooth flow of sustainment cargo, MSC and MTMC established the Special Middle East Sealift Agreement (SMESA) with seven liner services. Operating out of ports on both U.S. coasts, MSC contracted a capacity under SMESA to ship up to 2,700 forty-foot equivalent unit containers per week to the Red Sea and Persian Gulf. To expedite air-eligible cargo diverted to sealift and other high-priority sealift cargo, we implemented a "Sealift Express" service similar to the CONEX operation in the Korean conflict. Using the existing terms of SMESA, Sealift Express expeditiously handled chartered cargo moving to the Gulf region with a goal of cutting shipment time to 23 days, 30 percent faster than regular SMESA service. SMESA was the first large scale military use of commercial intermodal systems, and worked extremely well. Based on this success, we encourage the services to expand their use of containerization, taking advantage of the U.S. merchant fleet's excellent intermodal container capability.

Managing the operation of a global transportation system requires extensive automated support. USTRANSCOM made significant strides in developing Command, Control, Communication, and Computer (C4) systems necessary to provide that support. New interfaces to the airlift and sealift scheduling systems were developed during Desert Shield/Storm to speed requirements information into the Joint Operation Planning and Execution System (JOPES). JOPES can now be used more readily in the deployment of forces and, in future versions, will assist theater CINCs like USCINCCENT in the employment of forces. The productivity gained through improved information flow, like these never before attempted interfaces, underscores the potential gains achievable by networking existing systems. USTRANSCOM is leading the effort to establish a Global Transportation Network (GTN) which will allow any user to access selected transportation information from any other user's data base.

While acknowledging the many factors which worked in our favor in Desert Shield/Storm, our ability to deploy a force to combat the fourth largest army in the world has shown the utility of our airlift and sealift assets. Never before in history has any nation transported so much, so far, so fast. The deployment has also pointed to needs in our strategic lift system, needs that can be addressed by your subcommittee, Mr. Chairman.

APPLYING TODAY'S EXPERIENCE TO TOMORROW'S TRANSPORTATION SYSTEM

Those who fail to learn from the past are destined to relive it. The final success of Operations Desert Shield/Storm may best be judged by the extent to which we are able to apply our experiences in improving tomorrow's transportation system. While we have come a long way in the past 10 to 15 years, many of our current lift assets are aging rapidly while the changing realities of world geopolitics and budget constraints here at home point to a growing need for improved air and sealift capabilities.

AIRLIFT INITIATIVES

From the onset of operations, our C–5 and C–141 fleets were pushed to the maximum. Already the workhorse airlifter for MAC, our fleet of C–141s flew over 8,500 missions in support of Desert Shield/Storm. Still, they operated at nearly 90 percent reliability. This level of effort did not come without a price, however, as they flew a year's worth of service life in only 7 months. The answer to our rapidly aging C–141 fleet is the C–17. Its modern design gives it the capability to bypass congested destination airfields and move large quantities of equipment, munitions, fuel, and outsized cargo directly to forward areas. Its lower manpower requirements and reduced operation and support costs make it more efficient, while its exceptional ground maneuverability increases cargo throughput, adding to its effectiveness.

We estimate that if the C–17 had replaced the C–141 during Desert Shield/Storm we could have met our airlift deployment requirements from 20 to 35 percent faster. The C–17's impact in the first 12 days of Operation Desert Shield alone would have allowed us to carry enough extra cargo to deploy an additional 12 tactical fighter squadrons plus two light infantry brigades. In addition to its strategic lift contribution, the C–17 would have provided the equivalent in-theater airlift of a 16 aircraft C–130 squadron. To sum it up, the C–17's flexibility means fewer intertheater missions, fewer crew members, less maintenance, additional intratheater capability, and a faster rate of cargo delivery. The Secretary of Defense's decision to build to an 18 aircraft per year production rate recognizes the need for this critical airlift asset. Your continued support for the six aircraft requested in fiscal year 1992 and the commitment to begin to ramp up production to the 12 aircraft request in fiscal year 1993 will ensure we reach that goal.

The maintenance of a balanced and integrated airlift system provides obvious operational advantages. Our global responsibilities require the entire airlift fleet be operated and managed from a global perspective, responsive to the unique needs of each of the theater commanders. For example, our C–130s operating in Southwest Asia today may be deployed to support other theater commanders in the future, but no matter where they are, they should always remain an integral player on the airlift team. Maintaining this integration of the theater and strategic fleets is the best means of ensuring efficient support to the unified commanders and individual services. It allows us to use our air mobility forces when and where they are most needed. By maintaining this fully integrated common user airlift fleet under MAC and USTRANSCOM, we will be able to maximize America's airlift capability.

SEALIFT INITIATIVES

Just as our review of history pointed to sealift as the limiting factor in every offshore deployment of U.S. forces, Desert Shield/Storm has once again demonstrated the critical role sealift plays in the projection of heavy combat forces. Vessel availability is not our only concern, however, as the pool of U.S. merchant mariners for manning these vessels is also in serious decline. While we anticipate the maritime labor unions will continue to be highly supportive of our needs, the fact is their membership continues to decline. We, in conjunction with the Maritime Administration (MARAD), Office of the Secretary of Defense (OSD), and the Navy, are investigating ways to ensure sufficient mariners are available to man our organic sealift assets. While the most attractive solution to the impending manpower shortage is to expand the number of billets through a robust merchant marine, we are evaluating the concept of a merchant marine reserve program.

While we were able to successfully man the reserve vessels in the RRF, there were some widely reported breakout delays caused in part by lower than desired readiness levels. Several options for improving the readiness of the RRF are being investigated to include improvements to the outporting plan, cadre manning on selected vessels, more frequent sea trials, and expanded use of RRF vessels for training and exercises. The RRF has proven itself to be a viable national defense asset. We must strive to improve its ability to support our sealift requirements.

Our experience in Operations Desert Shield/Storm also emphasizes the need to tailor our organic sealift assets to meet the unique requirements of a military mobilization. In my opinion, we will need to immediately bolster the RRF with more Roll-on/Roll-off (RO/RO) ships, expand our afloat prepositioning force for rapid response, and build additional strategic sealift ships. The Mobility Requirements Study (MRS) currently being completed by DOD in response to last year's Defense authorization bill, will quantify all our strategic lift needs into the next century. However, I believe we can begin the effort of improving our organic sealift capability through a balanced approach of acquiring existing RO/RO ships using MARAD acquisition funds while constructing modern diesel propelled RO/RO ships in U.S. shipyards with the 1.275 billion dollars appropriated for strategic sealift. The solution to our future sealift capability as a nation, however, must also include efforts to improve the U.S. merchant marine. A revitalized merchant marine supplemented with an organic capability of well maintained militarily useful ships, along with the establishment of a merchant marine reserve, would provide us a sealift mobility structure designed to meet the evolving threats of the 21st century.

CONCLUSION

Desert Shield/Storm may in many ways be a model for future conflicts in the post cold war "new world order." Our shift of focus from a superpower conflict in Europe to regional contingencies worldwide will be accompanied by a drawdown of overall U.S. forces and, more importantly, fewer forces forward deployed. This combination puts increased emphasis on strategic lift. The lesson we should take away from Desert Shield/Storm is that our Nation must be prepared, with little warning, to project significant U.S. forces great distances to areas that may have little or no infrastructure. Our ability to respond to this challenge requires adequate, flexible mobility assets like the C-17 and militarily useful RO/RO ships.

History has demonstrated the critical role our strategic lift assets play in providing a credible conventional deterrent. Our ability to fight and win is dependent upon the effectiveness with which we project U.S. forces to any theater of conflict. If rapid deployment prevented Saddam Hussein from moving his troops into Saudi Arabia, then mobility itself can be seen as a deterrent to military aggression. We will continue to work through the administration and with you, the Members of Congress, to foster the robust, flexible, balanced, and responsive mobility system, so critical to achieving our national objectives. With your continued support of strategic mobility programs, USTRANSCOM and our components can help promote this Nation's credible deterrent posture wherever we find our interests at risk in the future.

Senator KENNEDY. Admiral Loftus.

STATEMENT OF VICE ADM. STEPHEN F. LOFTUS, U.S. NAVY, DEPUTY CHIEF OF NAVAL OPERATIONS (LOGISTICS)

Admiral LOFTUS. Thank you, Mr. Chairman. I have a statement that I would like to submit for the record.

Senator KENNEDY. All the statements will be included in the record.

Admiral LOFTUS. I will summarize then, sir.

Today the Navy is working simultaneously on four separate, but related sealift initiatives, all of which are needed to articulate a plan for the use of the SCN funds, which were authorized and appropriated for sealift in fiscal years 1990 and 1991.

The first and the foremost is the Mobility Requirements Study (MRS), which you referred to, being conducted by the Joint Staff for the Secretary of Defense in response to section 909 of last year's authorization act. The MRS is intended to define mobility system requirements, including sealift, for the remainder of the decade.

Senator KENNEDY. Could you tell us when we are going to receive the study?

Admiral LOFTUS. You have the interim responses, which was delivered on April 22, Mr. Chairman, and the rest of the study should be completed by the end of November, this year.

The interim response to the MRS identified a general requirement for more sealift; large, medium speed roll-on/roll-off ships. However, key questions influencing the ship design still remain unanswered. Should these ships be designed for afloat prepositioning? Should they be designed for retention with partial crews in U.S. ports, or should they be designed for use in the commercial trade under build and charter arrangements as was directed in section 1424 of last year's authorization act? Moreover, since the early MRS results indicate that the sealift shortfall potentially extends across the early, the mid, and the late delivery periods, how many of each type ship will be required? And without those answers, we can only go so far in the acquisition process.

Second is the Maritime Administration's (MARAD) current solicitation to expand the Ready Reserve Force (RRF) by purchasing existing roll-on/roll-off ships, or RO/ROs, from the commercial market. The Mobility Requirements Study assumes that by 1994 there will be 104 dry cargo ships in that force. Yet today there are only 83. Thus, if some 21 additional ships, preferably RO/ROs, are not acquired under that program, the sealift shortfall that must be met by new construction or major conversion will be even greater than that posited by the MRS interim response. When people speak of buying ships to provide immediate gains in sealift capability, it is this MARAD program upon which they should focus.

Finally, there are two alternatives within the Navy's sealift ship construction program. Section 1424 of the authorization act recognized that there would be circumstances when, in the judgment of the Secretary of the Navy, it would be essential for national security reasons to have ships constructed under that act more readily available to deploy U.S. forces than would be possible if they were employed in commercial trade. Such circumstances would include a need for fully-manned ships in afloat prepositioning mode or for partially manned ships retained in a high degree of readiness in U.S. ports like the present fast sealift ships.

Because the ideal design for a sealift ship is for afloat prepositioning or as part of a quick response from the U.S. will vary considerably from a ship that would be used in commercial trade, one focus of the Navy's efforts is toward the potential acquisition of ships that are capable of fulfilling these missions. These ships would be acquired through new construction or major conversion and would have similar dimensions as existing fast sealift ships, but carry more cargo. Once acquired, these ships would remain part of the organic DOD strategic lift force.

However, after the initial surge of any deployment scenario, the remaining cargo can be delivered in ships drawn from the commercial trade either by charter, as was done in Desert Shield, or from recall from a build and charter program as envisioned by section 1424. A second focus of the Navy program is toward the design of ships that would be commercially viable and capable of being quickly converted to military service. Such a program would contribute to the revitalization of the U.S. Flag Merchant Marine and the preservation of our shipyard industrial base.

Some of the early investigations have confirmed that there is real potential to establish some form of build and charter program under section 1424. Several operators have indicated interest in using ships constructed under this program in specialized trades, such as the contract carriage of automobiles. This would enable the ships to be available for military use without the economic impact of withdrawing ships from the highly structured intermodal liner trade. Our analysis indicates that up to 20 percent of such a force could be available for loading on the U.S. east coast and gulf coast within 5 days of their initial recall and 75 percent within 2 weeks.

In the end, the Navy sealift program may contain ships for a mix of employment modes; prepositioning, reduced manning in U.S. ports, or build and charter commercial trade. The final MRS results, which should be available in November, will be the key to determining how to structure that mix.

The second major topic that I would like to address is the progress made on the research into alternative forms of fast sealift; and by means of introduction, I would like to review how that effort began and has evolved as a result of cooperation between the Congress and the Navy Department.

The 100th Congress requested that the Secretary of the Navy assess the potential application of advanced technologies to sealift. In our January 1989 response, the Navy identified three hull form alternatives: displacement monohull, semi-planning monohull, and the surface-effect ships. The costs, the schedules and the risks were identified for each option, and in fiscal year 1990, the 101st Congress established two fast sealift programs: the near term, fast sealift ship effort, discussed earlier, and a technology development program. Under the latter program, the Congress tasked the Navy to initiate a 2-year, comprehensive, and integrated R&D program leading to advanced sealift ships described in the 1989 report. In last year's authorization, this committee remained concerned about fast sealift but recognized the conventional wisdom that speed by and of itself may not be as important. In support of these efforts, Congress provided the Navy the first $15 million of a $30 million program envisioned to investigate various technologies.

Mr. Chairman, because your time is so limited, I am going to stop my summarization at this point, and we can pick this up as you prefer later on.

[The prepared statement of Admiral Loftus follows:]

PREPARED STATEMENT BY VICE ADM. STEPHEN F. LOFTUS, USN, DEPUTY CHIEF OF NAVAL OPERATIONS, LOGISTICS

Good morning, Mr. Chairman and members of the committee. I am Vice Adm. Stephen Loftus, Deputy Chief of Naval Operations for Logistics and the Navy's program and resource sponsor for strategic sealift. I am pleased to appear before the committee today to testify on two important issues: the status of the near term strategic sealift ship acquisition program, and the progress made in sealift research and development.

The near term sealift program is unusual among defense programs in that procurement funds were authorized and appropriated beginning in 1990, in advance of the definition of an operational requirement with sufficient specificity to support acquisition. As a result, we have been working very hard to expedite the acquisition planning process to catch up with the funds. At this point we are looking at doing in months that which normally requires years. However, before going into the details of where we stand in acquisition planning, let me first give you a broad over-

view of current efforts to improve our sealift capability in the light of Operations Desert Shield and Desert Storm.

Today we are simultaneously working four separate, but related, sealift initiatives, all of which are needed to articulate a plan for the use of the SCN funds authorized and appropriated for sealift in fiscal years 1990 and 1991.

First and foremost is the Mobility Requirements Study or MRS being conducted by the Joint Staff for the Secretary of Defense in response to section 909 of last year's authorization act. The MRS is intended to define mobility system requirements, including sealift, for the remainder of the decade. Therefore, any sealift acquisition program must be consistent with the MRS findings. The interim response to the MRS that was provided to Congress on April 22 has identified a general requirement for more sealift—large, medium speed, roll-on/roll-off ships. However, key questions influencing ship design remain unanswered—should these ships be designed for afloat prepositioning, retention with partial crews in U.S. ports, or for use in commercial trade under build and charter arrangements as directed by section 1424 of last year's authorization act? Moreover, since the early MRS results indicate that the sealift shortfall potentially extends across the early, mid and late delivery periods, how many of each type ship will be required? Without those answers we can only go so far in the acquisition process.

Second is the Maritime Administration's current solicitation to expand the Ready Reserve Force by purchasing existing roll-on/roll-off ships or RO/ROs from the commercial market. The MRS assumes that by 1994 there will be 104 dry cargo ships in that force, yet today there are only 83. Thus, if some 21 additional ships, preferably RO/ROs, are not acquired under that program, the sealift shortfall that must be met by new construction or major conversion will be even greater than that posited by the MRS interim response. When people speak of buying ships to provide immediate gains in sealift capability, it is this MARAD program upon which they should focus.

Finally, there are alternatives within the Navy's sealift ship construction program. Section 1424 of the authorization act recognized that there could be circumstances when, in the judgment of the Secretary of the Navy, it would be essential for national security reasons to have ships constructed under that act more readily available to deploy U.S. forces than would be possible if they were employed in commercial trade. Such circumstances would include a need for fully-manned ships used in an afloat prepositioning mode, or for partially manned ships retained in a high degree of readiness in U.S. ports like the present Fast Sealift Ships.

Both of these concepts proved themselves in Operation Desert Shield. The Marine Corps maritime prepositioning ships and the other ships of the afloat prepositioning force were the first sealift to deliver in the Gulf, arriving barely 1 week after the decision to deploy U.S. heavy forces. Conversely, the conventional sea line of communication from U.S. ports, with the Fast Sealift Ships as its leading edge, did not close until nearly 3 weeks after the deployment decision. Nonetheless, the ability of the Fast Sealift Ships to activate on time similarly validated the concept of reduced operating status for quick-reaction sealift forces. Even including data from one ship which activated from the middle of an overhaul, the fast sealift force activated in an average of 98 hours, against a standard of 96 hours.

Because the ideal design for sealift ships used for afloat prepositioning or as part of a quick response force from the U.S. will vary considerably from a ship that would be used in commercial trade, one focus of Navy efforts is towards the potential acquisition of ships that are capable of fulfilling those missions. These ships would be acquired through new construction or major conversion and would have similar dimensions as the existing fast sealift ships but carry more cargo. Once acquired, such ships would remain part of the organic DOD strategic sealift force.

However, after the initial surge in any deployment scenario, the remaining cargo can be delivered by ships drawn from commercial trade either by charter as was done in Desert Shield, or by recall from a build and charter program as envisioned by section 1424. A second focus of the Navy program is towards the design of ships that would be commercially viable and capable of being quickly converted to military service. Such a program will contribute to the revitalization of the U.S. flag merchant marine and preservation of our shipyard industrial base.

Early investigations have confirmed that there is real potential to establish some form of build and charter program under section 1424. Several operators have indicated interest in using ships constructed under this program in specialized trades such as the contract carriage of automobiles. This would enable the ships to be available for military use without the economic impact of withdrawing ships from highly structured intermodal liner trade. Our analysis indicates that up to 20 per-

cent of such a force could be available for loading on the U.S. east and gulf coasts within 5 days of their initial recall and 75 percent within 2 weeks.

In the end, the Navy sealift program may contain ships for a mix of employment modes—prepositioning, reduced manning in U.S. ports, or build and charter commercial trade. The final MRS results will be the key to determining how to structure that mix.

Let me now describe where we stand on the implementation of an acquisition plan for this program. Based on the Secretary of the Navy's letter of February 7 which initiated the Sealift Acquisition Program, the CNO directed the Naval Sea Systems Command to develop a series of sealift ship design concepts. These concepts were to include sufficient technical and cost data to enable us to make preliminary decisions as to which of the several acquisition alternatives—buy, convert, construct—is best for each of the prospective employment modes—prepositioning, reduced operating status, or build and charter commercial trade. The initial data in response to that direction was provided on April 16.

Based on the interim response to the MRS to which I referred earlier, the Navy has also prepared a mission need statement for strategic sealift which should be considered by the Joint Requirements Oversight Council within the next month. That is the first step in the formal DOD acquisition process.

Concurrently, the Navy is also preparing an interim response to Congress on our implementation plan for the 1990 and 1991 funds as required by section 1424 of the authorization act. This response will be provided later this summer, and will address in greater detail how our acquisition planning will dovetail with the operational requirement as specified by the MRS interim response and the guidance provided by the Defense Acquisition Board. Once the MRS has answered the additional requirements questions I have outlined above, we will then be able to provide the final version of that report.

In sum, the acquisition process is underway, and we are moving as rapidly as the generation of the operational requirement by the MRS will permit.

The second major topic I would like to address is the progress made to date on research into alternative forms of fast sealift. By means of introduction, I would like to review how the effort began and has evolved as a result of cooperation between the Congress and the Navy Department.

The 100th Congress requested that the Secretary of the Navy assess the potential application of advanced technologies to sealift. In our January 1989 response, the Navy identified three hull form alternatives: displacement monohull, semi-planning monohull and the surface effect ship. Costs, schedules and risks were identified for each option. In fiscal year 1990, the 101st Congress established two fast sealift programs: the near term fast sealift ship effort discussed earlier, and a technology development program. Under this latter program Congress tasked Navy to initiate a 2 year, comprehensive and integrated R&D program leading to the advanced sealift ships described in the January 1989 Secretary of the Navy report. In last year's authorization, this committee remained concerned about fast sealift but recognized the conventional wisdom that sped by and of itself may not be as important. To support these efforts, Congress provided the Navy the first $15 million of a $30 million program envisioned to investigate various sealift technologies.

The Navy has adopted a two phased approach to fast sealift R&D. Since any radically new hull form, propulsion system or major cargo handling improvements could not be introduced into construction for several years, our mid term sealift R&D efforts—for ships to come on line in 1998—are focused on monohull ships with diesel or gas turbine propulsion. This ship design, for up to 35 knots, would remain effective until a far term ship design is developed for the year 2010. This additional time is necessary to reduce the risks associated with advanced technologies such as semi-planning monohull or surface effect ships with power plants and propulsors in the sizes necessary to meet strategic sealift requirements. This approach was determined to be acceptable by the OSD staff last January when they released the initial R&D funds; the remainder of the $15 million was made available last March.

These funds have been allocated to support three sealift initiatives: the Mobility Requirements Study, the near term ship design, and technology development work. Progress to date on the MRS and near term ships were provided earlier, and I will now address the mid and far term R&D efforts.

To ensure that any future sealift design provides real improvements, we have commissioned a working group of Navy and MARAD sealift experts to formulate measures of effectiveness to evaluate alternative ship designs, systems, and technologies. As an example of how we hope to generate new ideas for this sealift effort, we have published a broad agency announcement in the Commerce Business Daily soliciting concept papers from industry for cargo handling systems and other system

components for Fast Sealift Ships. Submitted concepts will be analyzed by simulating real world cargo loadouts so that those which optimize loadout capacity and delivery times can be incorporated into future sealift ships.

A second area of special attention is ship producibility. MARAD is scheduled to obtain inputs from several ship builders as part of this effort.

Various machinery systems are being investigated for applicability to both mid and far term sealift ships—including introducing slow-speed diesel industrial capability in the U.S. for the near term ship, and intercooled recuperated or ICR gas turbines and advanced electric drive for the far term sealift ship.

Other areas that our Navy/MARAD team is studying to get the competitive edge include hydrodynamics, reduced manning, hull structure technology, and ship survivability. Finally, we are also going to evaluate the market potential for high speed commercial sealift.

In summary, Mr. Chairman, I have outlined the Navy's requirements oriented process to solving the near and mid term sealift shortfalls that are being documented by the Mobility Requirements Study. As of yet, we have not fully addressed the far term effort for ship construction beyond 2010. The long term threat is still being defined, and we will need some additional time to structure a sealift program to meet it. We will address this issue, including how much of the 15 million dollars of additional funds you had originally projected for fiscal year 1992 will be required to cover the near and mid term R&D efforts in the Secretary of the Navy's report later this summer.

Mr. Chairman and committee members, I want to thank you for this opportunity to testify before you today and provide a snapshot on the status of the Navy's near term sealift acquisition program and of the R&D efforts for future sealift ship construction. This concludes my prepared remarks, and I will be glad to answer any questions the committee may have.

Senator KENNEDY. Thank you very much, Captain Leback.

STATEMENT OF CAPT. WARREN G. LEBACK, ADMINISTRATOR, MARITIME ADMINISTRATION, U.S. DEPARTMENT OF TRANSPORTATION

Captain LEBACK. It is a pleasure to appear here before you today, Mr. Chairman and other members of the subcommittee, to present an overview of the sealift effort which supported the coalition forces during the Persian Gulf conflict, and which continues today as equipment and vehicles are returned to the United States and Europe.

Just let me say that the teamwork and the unselfish performance that MSC, the U.S. Coast Guard, TRANSCOM, MTMC, the domestic shipyards, seagoing unions, ship operators, port terminal operators, and MARAD consistently demonstrated throughout Operations Desert Shield and Desert Storm have been exemplary. They certainly have all earned our country's gratitude.

MARAD's principal focus during the Persian Gulf conflict in response to MSC's request for vessel activation was to activate a total of 78 of the 96 ships in the Ready Reserve Force. This was done over a period of approximately 8 months and in 19 different activations. This activation over time permitted us to utilize the available facilities, particularly the shipyards, and allowed the unions to provide the manpower required to man the vessels.

However, I must point out that had we been instructed by DOD to break out all 96 ships simultaneously, we could not have done it. Our shipbuilding and our ship repair facilities would not have been adequate to have delivered the ships within the 5, 10 and 20-day periods, nor would the seagoing labor forces have been available to man those ships in a short period of time.

I have attached to my statement, Mr. Chairman, a copy of the RRF vessel activation data for Operations Desert Shield and Desert Storm. I want to point out that the RRF ships carried over 25 percent of the dry cargo sealift transported by U.S.-flag vessels. Together all U.S.-flag vessels engaged in this crisis carried nearly 80 percent of the total dry cargo sealift. About 95 percent of the cargo needed to support the military operations in the Persian Gulf was provided by sealift.

As my colleagues from DOD can reaffirm, although Operations Desert Shield/Desert Storm severely challenged the sealift and logistic limits of the system, they certainly did not represent a worst case scenario. Briefly, the widespread coalition support, modern port facilities, as General Johnson indicated, in the Persian Gulf to off-load cargo, the phased activation of the RRF, as mentioned by myself, the availability of petroleum fuels in the area, and the limited enemy threat to naval and shipping operations all facilitated the sealift effort over approximately 6 months preceding actual combat operations.

In this environment, the delays in delivering RRF ships, some of which had not been activated for over 12 years, did not harm the overall effort, though we must not be complacent about that because the next time around we may not have that 6 months on the buildup.

I spoke earlier about the lay-up procedures we are going to employ when the ships return. Furthermore, a number of options are being evaluated to facilitate a rapid response in time of emergency, such as placing certain top priority vessels, primarily roll-on/roll-off ships in reduced operating status and manning them with partial crews.

If funding levels permit, we may also assign small retention crews to priority vessels that will be outported. This has worked very well in the fast sealift program on the FSSs. The responsibilities of such crews would include minor repairs, machinery testing, and thorough familiarity with their vessels to ensure smooth activations.

Today, MARAD already has a request for proposals on the street which would allow us to acquire more RO/ROs and any other suitable vessels. It is imperative that this RFP not be limited to the acquisition of only U.S.-built vessels. Such restrictions will not result in the acquisition of the best vessels available at the most competitive prices. I must point out that we believe in MARAD that approximately eight U.S.-flag RO/ROs will probably be offered in under this RFP, of which only one was constructed in the United States. The other seven were purchased by U.S. operators for commercial operation, and reflagged to meet the laws of the United States. Such restrictions would prohibit these operators from offering these vessels in which had been engaged in primarily in moving cargoes in Desert Storm and Desert Shield. In fact, restrictions could be expected to force the acquisition of less desirable vessels at inflated prices. Certainly we must give concern to the ability to be as flexible as possible to get the best price and the best vessels available for the fleet.

Senator COHEN [presiding]. Captain, why are they purchasing the ships elsewhere? What is wrong with American manufacturing?

Why are the commercial companies purchasing from shipyards elsewhere?

Captain LEBACK. Well, the ones that will probably be offered in that were built foreign and reflagged or built for American flag were built for commercial operations, and with the exception of two vessels, primarily engaged in transporting defense cargoes under the 1904 Act to northern Europe. We do not know how much of that trade will remain, and the companies have indicated that they would like to be able to dispose of these vessels and use the monies for other shipping ventures.

We are also working with the Navy to identify additional program enhancements to ensure RRF readiness in the future. When completed, the findings of the Mobility Requirements Study may contain more initiatives to improve readiness.

Let me address another aspect of U.S. sealift, and that is personnel. This committee is concerned with the availability of an adequate number of trained personnel to crew RRF vessels and other sealift ships in time of crisis. We have testified on many occasions about the negative effect on emergency vessel manning resulting from the long-term downward spiral of shipboard employment opportunities caused by the continued decline of U.S.-flag merchant fleet. The number of active seafarers has decreased by about 40 percent in the last decade in response to this decline. MARAD and DOD agree that, within the next decade, we will reach a point where there will be an insufficient number of trained officers and seamen working in the deep-sea American merchant marine to crew the RRF in an emergency. We are looking into how to stem that, how to correct it, and to provide an adequate base not only to man the active vessels, but also the Ready Reserve Force and the control vessels that MSC operates.

Now, the unions did a yeoman's job in supplying the crews. They not only changed their shipping rules, changed their vacation rules, but they also went into their retired list and brought back a number of retired officers and seamen. We have been criticized on the age of some of those people, and I must point out that operating a Ready Reserve Force whose average ship age is 25 years with technologies going back 25, 35, and 45 years, particularly in the propulsion systems, that those older engineers were valuable in starting up ships that they were very familiar with. Certainly age did not play a factor as far as I was concerned.

Senator COHEN. Does that mean if we have newer ships, we can only have younger——

Captain LEBACK. Not necessarily, Senator. Our training programs will encompass the retraining of the retreads, if you want to call them that. [Laughter.]

It certainly is an area which we have to look at, and one of the things is reemployment rights of merchant seamen who have valid licenses and valid documents who have spent maybe 5, 10, or 15 years at sea and then have come in to employment ashore, who take pride in maintaining their licenses and their documents and were willing, as we found out in Operations Desert Shield/Desert Storm, to return to sea on a voluntary basis. However, unlike the uniformed reserve services, they did not have the right to reemployment of their jobs that they had given up. Now, there is a bill

moving through Congress, which passed in the House several weeks ago and will be coming up to the Senate, which will provide merchant seamen with those reemployment rights. On that hangs our long-term reserve program or providing adequate seamen in times of emergency.

In conclusion, Mr. Chairman, experts in and out of government will continue to examine the lessons learned from our Persian Gulf experience for quite some time. However, it is already clear that an adequate and reliable U.S.-flag sealift capacity remains indispensible to the national security of the country. The key roles of both the RRF and, as importantly, the private, U.S.-flag merchant fleet have been clearly validated, and we must not forget this, which we have had a tendency over the years to forget the U.S.-Flag Merchant Marine once the emergencies or the national emergencies have passed.

Thank you, Mr. Chairman, for permitting me to testify this morning, and I will answer any questions that you or the members may have.

[The prepared statement of Captain Leback follows:]

PREPARED STATEMENT BY CAPT. WARREN G. LEBACK, ADMINISTRATOR, MARITIME ADMINISTRATION, DEPARTMENT OF TRANSPORTATION

Mr. Chairman and members of the subcommittee, I appear before you today to present an overview of the sealift effort which supported the coalition forces during the Persian Gulf conflict and which continues today as equipment and vehicles are returned to the United States and Europe.

Allow me to state briefly how proud I am of the job that our domestic shipyards, seagoing unions, ship operators, port terminal operators and hardworking MARAD employees did in this massive sealift effort. The teamwork and unselfish performance that MSC, USCG, U.S. TRANSCOM, MTMC and MARAD consistently demonstrated throughout Operations Desert Shield and Desert Storm have been exemplary. All who served have earned our country's gratitude.

MARAD's principal focus during the Persian Gulf conflict in response to MSC's request for vessel activation was to activate a total of 78 of the 96 ships in the Ready Reserve Force (RRF). The phased breakout of RRF ships, from August 10, 1990, through March 5, 1991, permitted work to be spread among U.S. shipyards and activation facilities. Simultaneoug activation of all 96 RRF ships, however, would clearly have resulted in substantial delays due to the overall condition of the ships with years of deferred maintenance, shipyard limitations and crew shortages. I have attached to my statement a copy of the RRF vessel activation data for Operations Desert Shield and Desert Storm.

The RRF ships carried over one-quarter of dry cargo sealift transported by U.S.-flag ships. Together, all U.S.-flag ships engaged in this crisis carried almost 80 percent of the total dry cargo sealift. These operations clearly reconfirmed that adequate and reliable U.S.-flag sealift capacity is indispensable to national security. About 95 percent of the cargo needed to support military operations in the Persian Gulf was provided by sealift.

Although the United States and the coalition forces have successfully liberated Kuwait, the RRF ships remain in operational status, except four tankers which are being deactivated, to assist in the return of large vehicles, tanks, and equipment. We are in the process of completing a comprehensive deactivation and lay-up procedure for RRF vessels when they are returned from service to assure that no mechanical problems or voyage repairs go unattended.

As my colleagues from DOD can reaffirm, although Operations Desert Shield and Desert Storm severely challenged the sealift and logistic limits of the system, they certainly did not represent a worst case scenario. Briefly, the widespread coalition support, the modern port facilities in the Persian Gulf to off-load cargo, the phased activation of the RRF, the availability of petroleum fuels in the area, and the limited enemy threat to naval and shipping operations all facilitated the sealift effort over approximately 6 months preceding actual combat operations.

In this environment the delays in delivering RRF ships, some of which had not been operated for over 12 years, did not harm the overall effort. I spoke earlier

about the lay-up procedures we are going to employ when the ships return. Furthermore, a number of options are being evaluated to facilitate a rapid response in time of emergency, such as placing certain top priority vessels, primarily roll-on/roll-off ships (RO/ROs), in reduced operating status (ROS) and manning them with partial crews. If funding levels permit, we may also assign small retention crews to other priority vessels that will be outported. The responsibilities of such crews would include minor repairs, machinery testing, and thorough familiarity with their vessels to ensure smooth activations.

One of the clear lessons the Navy has learned from this operation is the tremendous naval utility of the RO/RO vessel for sealift. The Navy has established a goal of 104 dry cargo vessels in the RRF by 1994. At this time, MARAD has 83 dry cargo RRF ships. The Navy states that 21 additional ships, preferably RO/ROs, must be acquired to reach this 1994 goal. It is possible that the findings of the ongoing DOD Mobility Requirements Study will result in a further increase. Today, MARAD already has a request for proposals (RFP) on the street which would allow us to acquire RO/ROs and any other suitable vessels. It is imperative that this RFP not be limited to the acquisition of only U.S.-built vessels. Such restrictions will not result in the acquisition of the best vessels available at the most competitive prices. In fact, restrictions could be expected to force the acquisition of less desirable vessels at inflated prices. There are not enough existing U.S.-built RO/ROs to meet the Navy's goal.

We are also working with the Navy to identify additional program enhancements for RRF readiness in the future. When completed, the findings of the Mobility Requirements Study may contain more initiatives to improve readiness.

Let me address another aspect of U.S. sealift besides the condition of the RRF. A related issue which concerns the industry, MARAD, DOD, and this committee is the availability of an adequate number of trained personnel to crew RRF and other sealift ships in a crisis. We have testified many times about the negative effects on emergency vessel manning resulting from the long-term downward spiral of shipboard employment opportunities caused by the continued decline of the U.S.-flag merchant fleet. The number of active seafarers has decreased by about 40 percent in the last decade in response to this decline. MARAD and DOD agree that, within the next decade, we will reach a point when there will be an insufficient number of trained officers and seamen working in the deep-sea American merchant marine to crew the RRF in an emergency. Expanding the base of jobs in the active fleet is the preferred solution, but even a reinvigorated private merchant fleet is unlikely to result in more shipboard jobs, given the smaller crews required to operate the larger, more modern ships. As a result, we are working with DOD to evaluate future requirements for emergency personnel.

Over 3,000 civilian mariner jobs were created by Operations Desert Shield and Desert Storm. All of the seagoing labor unions participated in this activity, and in our view they did an exceptional job in filling so many shipboard jobs on such short notice.

Despite their best efforts, the unions were not able to fill this massive call for people from among their active membership. They were forced to go to their retirees, many of whom were no longer active and without any recent seagoing experience. In some cases, these "old" but experienced "hands" provided valuable assistance due to their previous work on the RRF vessels. In other cases, seamen and officers reporting to ships were unfamiliar with shipboard systems, both deck and engineering. The limited number of activations prior to Operation Desert Shield had provided virtually no time for on-the-job training. We also experienced severely unequal demand for labor from the various labor sources, a by-product of both the RRF ship manager selection process and the type and sequence of RRF ships activated by the military. These and similar significant problems with personnel need to be addressed. Along these lines, we hope that Congress will act favorably on the administration proposal to extend reemployment rights to all the uniformed services, including merchant seamen.

In conclusion, Mr. Chairman, experts in and out of government will continue to examine the lessons learned from our Persian Gulf experience for quite some time. However, it already is clear that adequate and reliable U.S.-flag sealift capacity remains indispensable to national security. The key roles of both the RRF and the private, U.S.-flag merchant fleet have been clearly validated. This is all too clear in time of war, and too often forgotten in time of peace. We must seize the opportunity to act while widespread public attention and support remain focused.

Mr. Chairman, this concludes my prepared statement, and I will be pleased to answer any questions that you and other subcommittee members may have.

04/26/91 PRF VESSEL TENDERING DATA

NO	VSL NAME	TYPE	STATUS RO	STATUS CT	EAST ACTIVATION	AGE	ACTIVATION ORDERED
1	GOPHER STATE	TACS	3	0	Jul-69	21.72	
2	FLICKERTAIL STATE	TACS	3	0	May-69	21.94	
3	ADM CALLAGHAN	RO/RO CTR	20	8		23.31	15-Aug
4	CAPE DECISION	RO/RO	5	4	Feb-86	17.64	10-Aug
5	CAPE DIAMOND	RO/RO	5	5	Aug-89	14.64	10-Aug
6	CAPE DOMINGO	RO/RO	5	5	Aug-89	14.66	10-Aug
7	CAPE DOUGLAS	RO/RO	5	4	Dec-86	18.14	10-Aug
8	CAPE DUCATO	RO/RO	5	5	Feb-88	16.12	10-Aug
9	CAPE EDMONT	RO/RO	5	5	Apr-87	20.02	10-Aug
10	CAPE HENRY	RO/RO	5	5	Aug-89	12.97	10-Aug
11	CAPE HORN	RO/RO	5	5	Aug-89	11.72	10-Aug
12	CAPE HUDSON	RO/RO	5	5	Aug-89	11.89	10-Aug
13	CAPE INSCRIPTION	RO/RO	5	5	Jan-90	14.07	10-Aug
14	CAPE ISABEL	RO/RO	5	5		14.46	10-Aug
15	CAPE LAMBERT	RO/RO	5	5		17.64	10-Aug
16	CAPE LOBOS	RO/RO	5	5		18.39	10-Aug
17	COMET	RO/RO	5	5		13.23	10-Aug
18	JUPITER	RO/RO	5	5		14.80	10-Aug
19	METEOR	RO/RO	5	5		24.03	10-Aug
20	CAPE ALEXANDER	BBLK/SEE	5	5	Jul-91	28.65	22-Aug
21	CAPE FAREWELL	LASH	5	5		17.72	24-Aug
22	CAPE FLATTERY	LASH	5	5		17.75	24-Aug
23	CAPE FLORIDA	LASH	5	5		21.14	24-Aug
24	CAPE MAY	SEABEE	5	5		28.58	24-Aug
25	CAPE MOHICAN	SEABEE	5	5	Apr-91	29.06	24-Aug
26	CAPE CATOCHE	BBLK	5	5		27.40	26-Aug
27	CAPE CLEAR	BBLK	5	5		27.40	26-Aug
28	CAPE JOHNSON	BBLK	5	5		28.90	26-Aug
29	CAPE JUBY	BBLK	5	5		28.83	26-Aug
30	CAPE ARCHWAY	BBLK/SEE	5	5		28.32	26-Aug
31	CAPE BORDA	BBLK	5	5	Jan-87	23.59	26-Aug
32	CAPE BRETON	BBLK	5	5	Sep-87	22.59	26-Aug
33	CAPE NOME	BBLK	5	5		23.36	26-Aug
34	CORNHUSKER STATE	TACS	5	5		23.84	26-Aug
35	DEL VALLE	BBLK	10	5		22.42	26-Aug
36	EQUALITY STATE	TACS	5	5		29.31	26-Aug
37	GULF TRADER	BBLK	5	5		26.29	26-Aug
38	WASHINGTON	BBLK	10	5	May-84	46.99	26-Aug
39	CAPE MENDOCINO	SEABEE	5	5	Sep-89	18.93	30-Aug
40	MAINE	BBLK	10	5	Jan-85	46.99	30-Aug
41	AMERICAN OSPREY	TSR/OPTR	10	5	Aug-89	33.07	31-Aug
42	AUSTRAL LIGHTNING	LASH	5	5		19.68	31-Aug
43	CAPE GIBSON	BBLK	5	5		22.31	31-Aug
44	CAPE GIRARDEAU	BBLK	5	5		22.37	31-Aug
45	CAPE ANN	BBLK/SEE	5	5	Sep-84	28.23	31-Aug
46	DEL MONTE	BBLK	5	5		22.31	31-Aug
47	GULF BANKER	BBLK	10	5		26.91	31-Aug
48	BANNER	BBLK	10	5		29.96	04-Dec
49	CALIFORNIA	BBLK	5	5	Nov-83	29.23	04-Dec
50	CAPE BLANCO	BBLK	5	5		24.56	04-Dec
51	CAPE BON	BBLK	5	5	Apr-86	22.73	04-Dec
52	CAPE BOVER	BBLK	5	5		24.15	04-Dec
53	CAPE CANSO	BBLK	5	5		27.56	04-Dec
54	CAPE CARTHAGE	BBLK	5	5		27.31	04-Dec
55	CAPE CATAWBA	BBLK	10	5		30.48	04-Dec
56	CAPE CHARLES	BBLK	10	5		27.56	04-Dec
57	CAPE COD	BBLK	10	5		28.06	04-Dec

58 COURIER	BBLK	10	2		29 21	04-Dec
59 DIAMOND STATE	TACS	5	5		28 98	04-Dec
60 NORTHERN LIGHT	BBLK	5	1		29 06	04-Dec
61 SANTA ANA	BBLK	10	2		29 15	04-Dec
62 AGENT	BBLK-SEF	5	2		30 23	08-Dec
63 CAPE ALAVA	BBLK	10	5		28 63	08-Dec
64 POTOMAC	TKR-OPDS	5	2		33 48	08-Dec
65 CAPE AVINOF	BBLK-SEF	5	5		27 80	03-Jan
66 LAKE	BBLK	5	2		30 06	11-Jan
67 PRIDE	BBLK	5	2	May-78	30 81	11-Jan
68 AMBASSADOR	BBLK-SEF	10	2		30 76	16-Jan
69 BUYER	BBLK	5	5		29 06	25-Jan
70 CAPE CANAVERAL	BBLK	5	5		27 17	25-Jan
71 MISSION BUENAVENTURA	TANKER	5	1		22 76	05-Feb
72 AIDE	BBLK SEF	10	5		30 76	22-Feb
73 AMERICAN EXPLORER	TANKER	10	2		31 48	22-Feb
74 MISSION CAPISTRANO	TANKER	5	5		20 06	22-Feb
75 SCAN	BBLK	5	2		29 81	22-Feb
76 SHOSONE	TANKER	10	1		30 98	22-Feb
77 GULF MERCHANT	BBLK	10	2		26 22	04-Mar
78 GULF SHIPPEER	BBLK	10	2		26 39	04-Mar
				Average Age	24 71	

OTHER VESSELS ACTIVATED[3]

79 CURTISS	T-AVB	5	2	Aug-89	21 72	Aug. 09
80 WRIGHT	T-AVB	5	4	Apr-88	21 14	Aug. 12

[1] Number of readiness days required when vessels are in C-1, C-2, or C-3 status. Vessels in C-4 or C-5 status are not within a prescribed number of readiness days.

[2] C Rating: C-1, no mission deficiencies; C-2, documented mission deficiencies; C-3, mission-degrading deficiencies which cannot be corrected within assigned readiness period; C-4, major deficiencies, cannot be corrected within readiness period; C-5, scheduled major repairs in progress, cannot get activated within readiness period.

[3] Navy-owned aviation support vessels, maintained by the Maritime Administration in RRF like status.

Senator COHEN. Thank you very much, Captain. I am going to yield to Senator Dixon for some questions that he has.

Senator DIXON. Mr. Chairman, I appreciate your usual courtesy in this regard.

First of all, I want to apologize to General Johnson for being here a little late and missing his testimony this morning. I had a 9:30 appointment with some folks from the United Airlines Credit Union, and it kept me for about 15 minutes. I regret very much that I missed your testimony.

I wanted to establish for the record, General Johnson, in view of the fact that there will be some discussion about this question this year, your support for the C–17, as you express it on pages 12 and 13 of your testimony because I remember very vividly your kindness in inviting me out to Scott Air Force Base to be in the readiness room very early in Desert Storm/Desert Shield when I observed all the things they were doing out there. As I recall, the C–141s went over and back in about 65 hours with about seven refuelings on the trip and so forth. I recall everybody involved in that expressing the view that we would be able to do so much more with the C–17.

Could you enlighten the committee here on that for us so that I can discuss it later in our markups?

General JOHNSON. Yes, sir.

We calculated that during the first 45 days of Desert Shield, substituting 80 C–17s for 117 C–141s would have increased our capability by 28 percent. But, more importantly, during the first 12 critical days of the buildup, we could have moved 12 additional tactical fighter squadrons, and two light infantry brigades. This is a very

critical portion. The C–17 would have given more throughput, and in a lesser capable area, it would have made even more of a difference because the Saudi Arabian ports, air and sea, were some of the world's best. The C–17, no question, would have made a tremendous difference up to 28 percent.

Senator DIXON. My recollection is that the outsized equipment like the tanks that we used and other things would not fit on the C–141 and would fit on the C–17. Is that correct?

General JOHNSON. Yes, sir. Anything that can be carried on the C–5 can go on the C–17, but it can also go into fields that C–130s use, 3,000 foot strips. So, it really opens the horizon. I do not want to take away from the forces that we had, be they C–141s, C–5s, C–130s, or the commercials. We found the outsized cargo was in great demand, particularly as we reached the crunch point of moving Patriot missiles and that sort of thing. We and the Soviets are the only people in the world who have the capability to move the outsized equipment, and even the Soviets got involved in moving some Dutch Patriot missiles.

Senator DIXON. I note on page 13 you say: "To sum it up, the C–17's flexibility means fewer intertheater missions, fewer crew members, less maintenance, additional intertheater capability, and a faster rate of cargo delivery. The Secretary of Defense's decision to build to an 18 aircraft per year production rate recognizes the need for this critical airlift asset." You ask our continued support for the six aircraft requested in fiscal year 1992 and the commitment to begin to ramp up production to the 12 aircraft in fiscal year 1993 to ensure that goal.

Do you consider that critical to an appropriate airlift capacity?

General JOHNSON. Yes, sir. I believe that the C–17 is critical to a continued capability by our country. Again, I am very proud of what the C–141 has done. Before Desert Shield began, we restricted the aircraft's cargo because of some potential cracks in the wings. We removed that restriction in wartime. As soon as the largest portion of the operation was over, the engineers came back, and we have inspected those aircraft and again found them air-worthy, but requiring a lot of improvement. The C–17 is badly needed for that reason. It is also badly needed because, as we bring back from our forward deployed posture to a more forward presence, we need to go back very, very quickly, and the C–17 is the kingpin, the linchpin, in our transportation from an airlift standpoint.

Senator DIXON. When do you expect the test flights to occur? There were some rumors it might happen in June. Is that still a possibility?

General JOHNSON. It is possible to fly in June, and that is the contractual date to fly. That has some risk associated with it, less risk in July. I saw the aircraft last Friday. There are many things that have to be done before first flight, and we want to make sure that we have a good first flight. Many people, including me, did not realize that first flight is really a transition. It does not land at the Douglas Aircraft Company. It lands on Edwards Air Force Base and continues the flight test. It is not a lift off the ground and land again. It is really a completion of a phase. We and everyone associated want to make sure that we do it correctly.

Senator DIXON. I thank you, General Johnson.

Again, I thank the Chair for his usual courtesy.

[The prepared statement of Senator Dixon follows:]

PREPARED STATEMENT BY SENATOR ALAN J. DIXON

Mr. Chairman, it is a pleasure to have with us today Gen. H.T. Johnson, Commander of the Transportation Command; Capt. Warren Leback, Administrator of Maritime Administration; and Vice Adm. Stephen Loftus, Deputy Chief of Naval Operations.

I look forward to hearing from them about the strategic lift capability.

I am concerned with our ability to move our troops and materiel in a crisis on short notice over long distances. Although our record in Desert Shield/Storm on the surface appears favorable, we must remember that 50 percent of our sealift was with foreign flag ships. We also must remember that the airlift was not forced to operate in a hostile environment.

I look forward to the testimony of our distinguished guests.

Thank you, Mr. Chairman.

Senator COHEN. I thank, Senator Dixon. We have just seen an example of the leading of a witness, a very friendly witness, on the C–17. [Laughter.]

General, let me ask you before Senator Dixon leaves. My understanding is there have been some adjustments in the C–17 program pertaining to length of runways and range. Could you tell us exactly what recommendations have been made to change these specifications and why?

General JOHNSON. Yes, sir.

Back in 1989, we looked very critically at the C–17 specifications. We looked to see if those specifications were absolutely demanded by my command, and we came up with some that were a little different in certain areas. We put those on the books right away. We call those the thresholds. That is what my command demanded, required. Contractually, they kept a higher specification in the contract.

As we went out for Lot II, contractually they properly went to the requirements that I had had, my command had had since 1989. So, there was no change from our perspective. They contracted at the level that we required as opposed to a higher level.

We can do our mission very well with these thresholds. That was the basis of looking at the requirements. We have not changed the length of the runways. We changed the amount of cargo on the leg between the east coast and Lajes, but not significantly on that. We refined certain things. One requirement was that we be able to land on short, austere fields. The contractor's initial solution was to land using a sink rate of 16 feet per second. We removed the unnecessarily high sink rate specification and now emphasize our requirement to operate into 3,000 foot runways.

Senator COHEN. Would you for the record submit exactly what changes have been recommended?

General JOHNSON. Yes, sir. We will give you a chart that shows before and after.

Senator COHEN. The question is going to be raised. On the one hand, when the request for the C–17 was made, we had to have an aircraft that could meet certain requirements—runways, flight legs—and some might question whether or not those have been adjusted now because of an inability on the part of the contractor to measure up to those specifications, so that you are adjusting the

specifications to fit the contractor rather than the military requirement itself.

General JOHNSON. Yes, sir. I have a chart that we will provide for the record that shows, number one, what we asked for when we originally asked for the proposal to build the aircraft, what the contractor offered, and what I require. That will be interesting. Certainly the contractor offered more than we asked for, and we went back and saw some things we did not need that much. I will provide that.

[The information follows:]

During negotiations for Lot III, MAC was informed by the C-17 System Program Office it was necessary to make minor adjustments to align contract specifications to MAC thresholds. Since these adjustments dealt only with range/payload specifications and did not breach MAC thresholds, we did not object. No adjustments were made which reduced the C-17's fundamental capability to deliver large, outsized loads into short runways. The following table details the original performance requirements in the 1980 Request for Proposal (RFP), the contract performance specifications derived from the Douglas Aircraft Company design solution, and the MAC thresholds which now represent Lot III specifications.

Mission	RFP ROM (lbs)	Specification ROM (lbs)	Threshold (lbs)
Max Payload	130,000	167,527	160,000
	600 NM	2400 nm	2400 nm
Heavy Logistic Msn	120,000	153,297	150,000
	2400 nm	2700 nm	2700 nm
		134,562	130,000
		3200 nm	3200 nm
Intertheater	180,000	174,039	170,000
Logistics Msn	2800 nm	2800 nm	2800 nm
Ferry Range	5000 nm	4915 nm	4600 nm
High Performance Logistic Msn (1)	70,000	81,546	75,000

(1) The RFP did not establish a minimum runway length for this mission. The specification and threshold now require the capability to perform this mission taking off from a 3000 foot runway.

Senator COHEN. Was that an offer that he could not carry through?

General JOHNSON. No, sir.

Senator COHEN. One that you could refuse, though.

General JOHNSON. Well, in our business we always like to accept more, but when you look and see what is right for the country, you recognize that some things we do not need.

Senator COHEN. General Johnson, during the war with Iraq, we chartered a number of foreign-flag ships. Why didn't we make greater use of U.S.-flag ships?

General JOHNSON. Sir, as my two colleagues can answer very well, in the various laws and conventions that have developed over time, we have a very precise hierarchy that we must follow. In all cases, we must go to the U.S.-flag fleet first, and then there are several other steps we must go through until we get to friendly and foreign shipping. The Military Sealift Command under Admiral Donovan's leadership went out with a request for proposal each time he needed ships, and that was an international request for proposal that asked for a certain type ship. If there were any U.S.-flags that qualified, they were hired, and we went down until we filled the requirement. So, we very, very carefully lived up to our

commitment to the American-flag companies and to our commitment to the American people to get lift.

Senator COHEN. Was there any consideration given to what the British experience was during the Falkland's war as far as the activation from the British ships at that time?

General JOHNSON. Yes, sir. We have a program in the Navy and DOD called Sealift Readiness Program. Under that program, any ship that is in it—and the way you get into the Sealift Readiness Program is to have dealt with DOD cargo or received some sort of subsidy over time. We had the right to call 50 percent of those ships. We did not exercise that right for several reasons. I will get to that in a moment.

By having that right, many of the ships, the critical roll-on/roll-off ships were offered for use. As Mr. Leback mentioned in his testimony, some of these ships were being used to haul military cargo in the North Atlantic anyway, and it was a matter of pulling them off that requirement and putting them on another DOD requirement.

Now, the reason that we didn't call the SRP was if we had taken ships—and many of these would be container ships—off of profitable routes and used them perhaps less efficiently in our business, then when the war was over, other people would have taken over those routes and our ships, our U.S. liner companies would not have a route to go back to.

Senator MCCAIN. Then we should not include those ships in our contingency plan.

General JOHNSON. No, sir. We should include them.

Senator MCCAIN. If we are not going to use them, I am not sure why we should.

General JOHNSON. Yes, sir. If I may, sir. I don't mean to interrupt, Senator McCain. There are two more points I would like to make.

First of all, I believe—and I think my colleagues will agree—if we had to do Desert Shield and Desert Storm with U.S. ships alone, we could have done that. But we would have taken container ships, put in flat racks, which is nothing more than a container without the sides and top, and also sea sheds which convert it pretty much to a break bulk ship, a much less efficient operation. We were able to get on the international market to get alternatives.

Now, I also must add that those ships that we would have called served us very well because they did, in fact, carry containers, 37,000 containers filled primarily with subsistence type cargo.

Senator COHEN. Well, the British experience was apparently that after they activated their commercial ships, they did not have routes to go back to. Their competition took over the market, and as a result, these ships did not return to commercial use. Is that the fear that you had, General, that basically if we started pulling these ships off these profitable routes, they would not have the routes to go back to? If that answer is yes or at least in part, the next question is, should we be subsidizing those ships to continue to stay in commercial operation?

General JOHNSON. Well, two answers. One is I believe we made the proper decision. Whether we activated the container ships or used them as we did, I believe that was a proper decision.

Also, our national sealift policy says we must maintain the capability to transport our forces in U.S.-flag ships alone, and I think it is important to do that. We have another historical example in the Arab-Israeli war where we had no support from any other country. The only country that supported us in that move was Portugal. In that situation, and if we were committed, we would have to pull out those ships regardless. I think it is important that we maintain that capability.

Perhaps Mr. Leback has some comments.

Captain LEBACK. Well, I think what General Johnson said is—and we did. We had numerous discussions between the three groups about maintaining the American flag viability on the Trans-Atlantic/Trans-Pacific routes and not destroying that, not giving up those routes to the foreign competition.

Now, you did mention the point on subsidy. I must point out that operating differential subsidies, since they came into effect in the 1936 Act, which is now over 55 years in being, that the sole purpose for the operating differential subsidy is to offset the wage differential between what we have in American seamen and what we are faced with from our competitors. It does not guarantee that the company is going to make a profit, nor does it guarantee a loss, nor does it guarantee an efficient operation. It is solely there to offset the differential cost between our standard of living in this country vis-a-vis what we see out there in the foreign-flag competitors.

Senator COHEN. Isn't the basis of it, though, the national defense requirement?

I will yield to Senator McCain in a moment.

The argument, I assume, that you have to make is that we have to continue the subsidy in this particular case, for national defense reasons, to keep the fleet out there as we might have to draw on it at some time, a situation that we in fact hope will not be the case provided we have international cooperation. If we didn't have the cooperation, we would then have to sacrifice the profitability of the routes in a time of extreme necessity. Is that basically it?

Captain LEBACK. Yes. Certainly I would say we would make that decision to sacrifice the profitability if we had to go it alone, such as we did in Vietnam and the greater part of Korea.

General JOHNSON. As you properly mentioned, sir, the Falkland's case is an ideal case study. The British Government, in essence, commandeered all the ships, and when the war was over, they had no place to go back to, and those ships are no longer available to support a similar type operation by the British.

Senator COHEN. Senator McCain.

Senator MCCAIN. Thank you, Mr. Chairman.

General Johnson, when is the C–17 going to have its first flight?

General JOHNSON. June is still the target date that we and the Douglas Company plan for, and it is certainly doable. I was out last Friday, and I asked what the long poles in the tent are. The answer was that there are some unknown things that can delay them, but everything is on schedule to make a June flight. We believe very strongly that that flight should be a good flight that terminates at Edwards Air Force Base and continues the flight tests, not just take off, land, come back to Douglas and finish building the airplane. So, we are all pushing that it be a legitimate flight.

There is high risk with June, less risk with July. I am still confident of June, but I'd rather have a good flight in July than a show flight in June.

Senator McCain. In testimony before this committee, 95 percent of the equipment was transported to the Persian Gulf by ship. If the C–17 were available would that statistic change much?

General Johnson. Sir, the statistic can be written any way. Of the dry cargo, 85 percent went by sea, 15 percent went by air. Of the resupply cargo, 28 percent went by air. Now, there are some reasons for all of this. Overall, if you add in the petroleum, then 95 percent went by sea. Always the sealift is the backbone that sustains any operation. The airlift provides a critical initial force deployment capability.

Airlift remained critical during this operation for several reasons. One, we used a supply-pull system. We did not establish a great supply base like Long Binh.

Senator McCain. I am familiar with that operation, yes.

General Johnson. We also kept building up. The war did not start, and everybody wanted the last minute item. Airlift it still critical for the initial deterrence, and sealift is the backbone. No question, sir.

Senator McCain. Now, I would like to ask my question again, General.

General Johnson. Sorry, sir.

Senator McCain. If the C–17 were in the inventory, would that statistic of 95 percent have changed?

General Johnson. Yes, sir.

Senator McCain. To what extent?

General Johnson. The 85 percent of dry cargo—the 15 percent by air would have gone up slightly because we used all the air that we had available. But more importantly General Schwarzkopf would have been more comfortable early on if he came under attack because he could have closed additional brigades as well as tactical fighter squadrons, and in a different situation where we did not have the runways and ramps, it would have been even more critical, sir.

Senator McCain. You still have not answered my question. Would the percentage, 95 percent, of all equipment and supply that went over there have changed with the C–17 in the inventory. Not 85, not 28, not 15. The 95 percent overall percentage.

General Johnson. It would have changed, but by a very, very small margin sir, because——

Senator McCain. Thank you very much for answering my question.

Admiral, when can we expect the Mobility Requirements Study?

Admiral Loftus. The interim response, as you know, Senator, was provided on April 22. The final report is due in the late November time frame, and should be to the Congress at that time.

Senator McCain. Does this give you some heartburn about the authorization cycle that we are going through now?

Admiral Loftus. As far as?

Senator McCain. The Congress having that information for use in the authorization.

Admiral LOFTUS. Clearly it would have been better if we had the answers to the kinds of questions that are needed. But the study is a very comprehensive one which takes the three legs of the strategic mobility triad and tries to make a logical decision on whether or not we are going to do afloat prepositioning, fast sealift, or airlift, and it obviously has been a very difficult thing to come forward with. The interim response basically said what we expected: that we do need more large, medium speed RO/ROs.

And to that extent, Senator—we are starting the acquisition process now. The Secretary of the Navy has directed CNO to get on with the initial concept design studies at NAVSEA. They are doing that. NAVSEA has issued the first results to the CNO, and the Mission Need Statement, which is the requirement that is needed before we get into the defense acquisition process, is in chop now, and will probably go to the JROC within 2 weeks.

So, we are going to be prepared. We know what is coming. We know what has been studied. We just do not know the exact types, the exact usage, and the numbers that we are going to have to have.

Senator MCCAIN. So, you think we have enough information to address what I think is the general consensus that there is a shortage of sealift capability. You think we have enough information at least for the next fiscal year to address that in this authorization bill without having the MRS. Is that basically accurate?

Admiral LOFTUS. I think we have enough information now to know exactly what you said. We need more RO/ROs. We know we need them, and we have enough information to start the acquisition process now. What we do not know exactly are the numbers and the types that are going to be required, Senator. I think having that information would be clearly helpful to the authorization process as well; but, I think we are about where we need to be. With the study being released this fall, I think we will be in fairly good shape.

Senator MCCAIN. What besides RO/ROs do you feel is necessary to enhance our sealift capability?

Admiral LOFTUS. Well, that would include MARAD's purchasing of ships for the RRF to meet the 142 ship goal—now, they are still 21 ships short of the dry cargo requirement. The RO/ROs are the top priority for that effort. That is ongoing now. There probably will be some other ships required to fill out the RRF, but to go from where you are today to 142 ships, it is not all RO/ROs. There are still some tankers and other ships that are required.

Senator MCCAIN. Thank you, Mr. Chairman.

Senator COHEN. General Johnson, who do you think should be designing these ships? The Navy, the commercial sector?

General JOHNSON. Sir, I believe that certainly the Navy has to manage the design and the building of any ships that we would build, but the design ought to be an off-the-shelf commercial type design as opposed to building a new ship to Navy specifications. We are, in essence, building a ship that would be used in commercial oriented type service, and that's the type ship we should build.

Senator COHEN. So, it should be commercial in design with modifications for military use, and the Navy should be the one to rec-

ommend the kind of flexibility in that design that would accommodate their needs in a time of crisis as such.

General JOHNSON. Yes, sir. There are only two government organizations that I know of that could do that. One is the Navy and the other is MARAD. I believe the Navy certainly is the proper one to lead that design effort, but it should be a commercial design as opposed to going to the Navy architect and designing a new ship.

Senator COHEN. Is the Navy in the business of trying to come up with the most effective commercial design with flexibility? In other words, it is kind of hard to say, here are the Navy engineers and they look at things from one perspective, as opposed to a commercial engineer who might see things quite differently. How do you have the Navy take into account the best or the most effective, efficient commercial design with built-in flexibility? Wouldn't you be better off having a commercial designer say here's the most effective one, now what would you like for flexibility?

General JOHNSON. I believe that we should select the best ship currently available, look at the blueprint and refine it, and again I think the Navy should ultimately be in the refining mode, but they should not design the ship. It should be commercially designed. I think Captain Leback has a——

Captain LEBACK. Yes. We are already working with the Navy, and under that $1.3 billion, the Navy and MARAD have a working agreement—Navy has transferred certain funds—in which we will review the initial designs to determine whether or not the designs, as General Johnson had mentioned, are commercially viable and can be adapted to commercial uses and still give the military the flexibility they need to transport their cargoes in time of national emergencies. It is working between the two of us already.

Admiral LOFTUS. Senator, I think it is important to understand that the starting process on that is a circular of requirements which lays out what we are going to need. That again is going to be determined finally by the full MRS report. Once the requirements go out, then it is a partnership, as has been expressed, between Navy, MARAD, and the shipyards themselves to get the detailed design and proposals.

Senator COHEN. General Johnson, last week the committee heard some testimony from General Gray, and he pointed out that commercial ships were used to support the Marine Corps. In his judgment, speed was not the most valued quality for the support ships, and he was more interested in their self-unloading capability with cranes and other types of devices. Now, some of these ships in the RRF are dedicated to the support of the Marine Corps. We have the TAVB aviation support ships, by way of example.

The question is, if the assault follow-on echelon in the Marine Corps is the 4th MEB, should we earmark ships in the RRF for this purpose?

General JOHNSON. Perhaps Admiral Loftus can better address that, but I don't believe we should earmark ships other than certain special purpose ships, TAVBs I believe they are called. They are really floating depots and operate very, very well. Certainly things like that are especially designed and equipped, but in general we are better off to have RRF ships available in the common user pool and then the command authorities can decide if they go

to the Marines, the Navy, the Army or whoever. We are better off not to earmark any more than we have to. The ones that are earmarked would be only because they are specially equipped.

Senator COHEN. Well, that is what he was saying. They want some specially equipped type of ships, again not with the emphasis on the speed, but on the ability to unload. The question is, should you start earmarking specific ships for that kind of capacity for the Marine Corps? The answer, I take it, is no.

Admiral LOFTUS. I do not think that we need to do that, Senator. There are, in fact, ships that are in the RRF that are made militarily useful by providing the capability required in the assault follow-on echelon, which is off-loading in the stream and being able to bring the equipment ashore. I think that is the kind of military usefulness that ought to be built into any of the ships that are being brought into the RRF. To assign them specifically probably does not make sense. The TAVBs are actually assigned specifically because they are the intermediate aviation level support for the Marine Corps ashore. So, beyond that, I am not sure there needs to be specific assignments.

General JOHNSON. That same capability that General Gray asked for is needed for all of our forces, not just the Marines. It is a universal-type requirement, and we respect his requirement very much and try to build that in.

Senator COHEN. General Johnson, my understanding is that most of the containerized cargo can be shipped through virtually any of our commercial ports. We have a unique safety problem with ammunition. Is there any problem on the west coast in getting ammunition, or shipping facilities?

General JOHNSON. Yes, sir. When we ship ammunition, we have a problem with quantity of explosives versus distance. It really needs to be in a remote area for obvious reasons. You recall the Vietnam days with using Concord in California. We used Concord in this conflict, but for very, very small shipments. The biggest port was Sunny Point, North Carolina, just south of Wilmington. It is out in an isolated area. It was built as an ammunition port to handle containers as well as break bulk. It worked very well.

For many years our country has needed a west coast ammunition port. We have been unsuccessful in getting one. We are looking with the JCS and the Department of Defense up and down the west coast for a viable port in the United States or perhaps southern Canada.

Senator KENNEDY. Captain Leback, has the Maritime Administration considered the formation of a merchant marine reserve?

Captain LEBACK. Yes. We have looked at it and are continuing to look at it. We have a program that we are formulating. We are doing it on a basis of what is out there and the total manpower available to us now, what the shortages were in Desert Shield/Desert Storm, and then looking toward building it up over the next 2 to 3 years primarily as a source dedicated to the Ready Reserve Force. But again, I have to state that unless we have that reemployment bill passed to make reemployment rights available to the merchant seamen, it is going to be a very hard program to put in place.

Senator COHEN. Admiral Loftus, does the Navy have any concept of what the merchant marine reserve might look like?

Admiral LOFTUS. We do, and we have a number of individuals in our own U.S. Naval Reserve, Merchant Marine Reserve program that might perhaps convert to this program. I think Admiral Donovan, in his earlier statements, indicated that he was as concerned as Captain Leback that we will, in fact, have some skills needed to operate RRF ships which are going to all but disappear; and because of that, we are going to have to have some way of providing skill mixes for specific ships. I think the Navy would prefer, as well as the rest of the country, to have volunteers from active merchant seamen to man the RRF, not to have a reserve force to do that specifically. I think there has to be a civilian merchant marine reserve of some sort to handle the kinds of ships that are still in the RRF and will still need to be manned in the future. I do not know what the exact number is, but it is a considerable number.

Senator COHEN. How long is it going to take to reconcile the concept for the reserve?

Captain LEBACK. Well, we are pretty close to having what we want. We are working very closely with both the Navy and TRANSCOM on the program. Our views are fairly well finalized, but I do not want to come forward with it unless I know I have that bill passed because, again, that is what will hang the reserve, the ability to offer them the reemployment rights in return for the volunteering in the reserve program.

Senator COHEN. General Johnson, have any cost figures been floated for a reserve such as this?

General JOHNSON. Yes, sir. We have had discussions with MARAD and certainly Captain Leback is absolutely right. The reemployment rights must be number one in anything we do. That is what makes our 1001 reserve programs work, and that has to be the cornerstone. Where you go past there, we have to work very closely to keep the current merchant marine labor organizations working with us. I believe we do need a reserve program, and as our people grow older, as has been pointed out earlier, we have to find a way to bring back in some people to the maritime community. The best way, of course, is to have a viable, strong maritime industry that has many billets which give work to the members of the industry. It is very difficult to ask someone who is not currently part of the merchant marine to come back in it without having some reemployment rights. That is the keystone.

Senator COHEN. If I could come back, Captain Leback, you mentioned that the American shipbuilding industry is opposed to allowing acquisition of foreign built vessels by the United States. They would like, I assume, to see vessels built here, right?

Captain LEBACK. Right.

Senator COHEN. Wouldn't construction of ships here be useful in building a better merchant marine capability?

Captain LEBACK. You are right. However, we must look at it this way. That $1.3 billion is a long-term program to build up the sealift capability. The $154 million—I have $50 million of funds in the 1991 budget that has been approved for acquisition of vessels for the Ready Reserve Force and $104 million in the budget for 1992.

Those funds will provide for the purchase of vessels in the interim period as we meet our goals for the RRF in 1994.

Now, it is true that on the shipbuilding side of it, the pure shipbuilding side of it, that $1.3 billion, that has build-American in it and so forth. On the acquisition side, the $154 million, if all of the monies are approved, also provides that the work to be done, which averages between $4 million to $5 million to convert a ship to American standards, must be done in U.S. shipyards and ship repair areas. There is a sizable portion of that shipbuilders group that is in that small shipbuilder/ship repair area that will benefit from using the $154 million to purchase the foreign-flag vessels in the interim period until we are geared up on the $1.3 billion.

If we started today and we had a design in place, it would still be close to 1994 before we would get our first ship, not that the shipyards cannot build it, but it is that paper process, defining the design, then doing the construction design, then going to the yards on the bid process or the negotiated process, then ordering the materials, and then finally the last 12 to 18 months when you physically build a ship. You are looking at somewhere between now and 1994 before we could get the first U.S.-built ship.

We must make the distinction between the $1.3 billion, which is a long-term program to support sealift to improve the shipbuilding base, and the short-term program, for which I have monies in a different account, to purchase the RO/ROs or other suitable vessels from a worldwide market. The results there would be to provide an interim work base for the smaller yards and the smaller firms.

Senator COHEN. Their argument is that the tradeoff is worth while, in terms of the delay as opposed to getting them more work and building up that merchant marine capability.

Captain LEBACK. We only have about five major yards that are capable of building the ships that we are looking at, and there are a sizable number of small yards and small ship repair firms that did a yeoman's job in the breakout of the 78 vessels. In fact, a greater number of the breakouts did not go to such yards as Newport News, NASSCO, Bath up in your State, which is a very good yard. I must commend Bath. They use another facility in the State of Maine, the Maine Maritime Academy, as a training ground for people.

Senator COHEN. In fact, I was just going to get to that, but go ahead. [Laughter.]

Captain LEBACK. We have to look at the smaller yards and the smaller ship repair firms as also benefiting from this sealift program. If we insist on shutting off the $154 million as far as MARAD is concerned purchasing worldwide on a competitive basis, you, in effect, hurt that smaller segment that did a very good yeoman's job in the breakout for Operations Desert Shield/Desert Storm.

Senator COHEN. Let me diverge from my normal procedure and get very parochial for a moment.

One of the ships activated was the SS *Avinof*, I believe. The work on the ship was performed in Maine and MARAD, I am told, is quite happy with the work itself, and that the graduates of the Maine Maritime Academy, in fact, were a significant portion of the mariners that you employed during Operation Desert Shield. The

question is, are you going to give any consideration to locating additional RRF ships in Maine? [Laughter.]

Captain LEBACK. We are looking at where to outport the vessels, the ones that are on the 5-day program, which has not been realistic. The greater part of the 65 ships that were on the 5-day breakout were in the reserve fleets. Certainly, we are looking at putting them, as I stated earlier, close to the repair facilities, and also another governing factor will be the proximity of where we can load them. They did an excellent job up there. We certainly will take it into consideration.

Senator COHEN. General Johnson, I am engaged in a little bit of a filibuster here until Senator Kennedy gets back, but perhaps you could give us an overview of some of the lessons from Desert Shield concerning the activation of the CRAF.

General JOHNSON. Yes, sir.

We activated CRAF. CRAF is in three stages. The first stage is very small, 38 aircraft. The next stage is—I do not know the exact number—190 or so. The final stage is 500. We activated the first stage on August 17. At that time we needed additional passenger aircraft, more than we could get on the open market, to carry troops to close on the fast sealift ships that were arriving with their equipment. It was still in the tourist season, and we could not get enough volunteers. That worked very well. The companies came forward and supported that program. The commercial liners continue to support us very, very well, and we did not need to activate a higher level until January.

The day the air war began, we activated Stage II. At this time we activated it because we needed long-range cargo aircraft. We had built up a backlog of sustainment of about 8,000 tons, and again the industry responded very quickly. That call only required 40 aircraft. That was the number of long-range cargo aircraft in Stage II. Within a matter of a couple days, we had 77 airplanes bringing down the backlog. The industry met every need. We never called the aeromedical evacuation segment, but they were prepared with their aircraft to evacuate the wounded troops if that had been required. I could not ask for better.

As we go forward, we will certainly look at the contracts in existence, see how we can refine them. There are some things from the industry standpoint that we can look at, others from our perspective. In general, it worked as advertised and is a tremendous partnership.

Senator COHEN. Will you tell us what are the problems with the national defense funding as far as sealift is concerned? What are sealift's problems and what should we do to change it?

General JOHNSON. Well, I believe that the funds that are currently available, depending upon how the mobility requirements study comes out, will be spent within the guidelines that the Congress has designated. Over time there have been competing demands for the funds that have been established. At this time—Admiral Loftus can correct me if I am wrong—the $1.275 billion are being held by the Office of the Secretary of Defense to be used strictly according to the desires of Congress, and the programs we have outlined I believe will be executed within the year.

Senator COHEN. What about funding for O&M, for example, for the Ready Reserve Fleet? Would you recommend any changes in that?

General JOHNSON. Sir, several years ago, the funding was under the U.S. Navy. It was transferred to the Department of Transportation. That particular year we asked for $239 million and were given $89 million, which was hardly enough to maintain the fleet. The $239 million would have allowed buying some more ships.

The following year—this is last year we are talking about—we asked for $225 million or so. This time it was placed under other defense related appropriations, 054, but still this committee does not address those funds. They are addressed by Commerce, Fisheries, and other committees that Mr. Leback reports to. I believe that your committee has a big interest in that, and I believe that Defense ought to be involved—and when I say Defense, I include your committee—in determining the level of funds because that is where the interest lies.

Perhaps Mr. Leback has a different view.

Captain LEBACK. No. We were shorted monies. I think further to what General Johnson said, there was one point where we had to compete with the civilian funds or funds for other work, and the fleet suffered. I think in support of the question you asked, we need to take a long look at having adequate funds over a period of time available to us to maintain the fleet and put the ready back into where it should be as what it is, the Ready Reserve Fleet.

We see that in 1992, when that budget is passed, we will have adequate funds for the 1992 budget. We will be looking very closely at what we need in 1993, and then I personally have some concern that interest will flag in 1994 and beyond. I think it has to be a long-term commitment in order to maintain the Ready Reserve Force as a sealift capability.

Senator COHEN. Chances are that you would receive greater consideration in this committee than you would in the Merchant Marine and Fisheries?

Captain LEBACK. The Ready Reserve Force can only be used in times of national emergency. There have been pressures on me to change things or look at changing it to be a supplement in the commercial field, and that is not what it was established for. It was not established to compete commercially. It was established to provide sealift capability in times of national need. We ought to look at that and fund it in that way.

Senator COHEN. Admiral.

Admiral LOFTUS. Senator, you may know that there is an MOU in existence between the Department of Defense and Department of Transportation in which MARAD's budget does come to the Department of Defense. It is reviewed there and approved as part of that MOU. So, there is an input from the Department of Defense side in the budget that goes forward.

General JOHNSON. The Department of Defense does not end up defending that appropriation. I am saying they should through you.

Senator COHEN. Gentlemen, thank you very much. I am going to declare a brief recess until Senator Kennedy comes back. He may have a number of questions he wants to ask you, but I am sure he

will be here momentarily. The committee will stand in recess until he returns. Thank you very much. [Recess.]

Senator EXON [presiding]. The subcommittee will please come to order.

As the witnesses know, Senator Kennedy was called to the floor and will be back very shortly.

I apologize for being late to this very important meeting. I had a previously scheduled engagement that I just completed.

I wanted to first thank all of you for the key role that you played in the successful operation of Desert Storm and Desert Shield. I think as we look to the future, we have to learn, which we learned a great deal from that conflict, to recognize what the shortcomings were, and it is pretty hard to find shortcomings in an operation as successful as this one. Looking to the future, especially with regard to projection of forces and maybe carrying out the operations that our forces undoubtedly will be called upon to carry out in the future, let me ask you this question.

Looking back in your roles in Desert Storm particularly, what one or two factors or points or shortcomings did you see that you would like to correct or improve upon if we were called upon next week to carry on a similar activity by order of the President with the authorization of the Congress? Anyone who wants to start. Admiral.

Admiral LOFTUS. I would be happy to start, Senator.

May I say, before I tell you the shortcomings, two things that we learned very clearly in this. One is that maritime prepositioning worked and worked very well. There is no question of that. Second, we learned that we are going to have to put funds against a Ready Reserve Force so that it can break out reliably. I think that was clear.

For the shortcomings, if you will, I think we all suspected, and all the studies showed, that there was going to be a shortage of the kind of lift needed for unit equipment.

Senator EXON. A shortage of what?

Admiral LOFTUS. Unit equipment lift, for heavy equipment. I think that, in fact, was borne out. That is the reason today why there is such emphasis on building RO/ROs and getting additional RO/ROs into the RRF. That is one.

Second, I think that there is a lot of work that needs to be done in the future on containerization of ammunition because that is a process which could probably be improved and the time line shortened if, in fact, we had a better process to containerize.

Limited to two, that is all I will stay with right now, sir.

Senator EXON. You did not mention mine warfare. I suspected that that would be one of the Navy's concerns. Did you overlook that?

Admiral LOFTUS. No, I didn't because I did not put it in that category, Senator. I thought you were talking about categorization of sealift alone.

Senator EXON. The problem was not serious. Is that right?

Admiral LOFTUS. As you know, the Navy is addressing mine warfare very seriously; and, as a matter of fact, has recently submitted a proposal from the CNO to the Secretary to concentrate its forces; mine countermeasure and mine hunting forces, in the Gulf in

order to consolidate training and to provide more emphasis on mine warfare in general.

Senator EXON. Mine warfare, minesweepers, the whole program is something that this Senator has been concerned about for a long time. Over the series of years in hearings in front of this committee and others, we have heard that, yes, we are not fully up to speed in that area, but we do have allies that have some capabilities.

It seems to me that while we do not expect to go it alone, I thought one of the lessons that I learned from the conflict over there is that we still are short on what I think is necessary or adequate minesweeping ability or mine destroying ability. We will have no way of knowing whether or not a marine landing there would have been impaired more by some of those mines. I worried a great deal about that. I suspect that with the ability that the Iraqis had to lay mines, many of them in the wrong places, there is always that very serious threat to our ships and our personnel with regard to mines. I hope that we will continue to give some increased attention to that as we look forward to the projection of forces. You would agree, I presume?

Admiral LOFTUS. Yes, sir. Since you follow that very closely, seven of the *Avenger*-class mine countermeasure ships have been delivered, seven more to come, plus the MHC program. So, there is a tremendous amount of emphasis in that program.

Senator EXON. The problems that we had—we had two ships struck I think within hours of each other on one day, if I remember correctly. Is that right?

Admiral LOFTUS. The U.S.S *Princeton* and the U.S.S. *Tripoli* were both struck with different types of mines.

Senator EXON. Did one or both of these ships strike influence mines? The ones that lay on the bottom and are attracted up?

Admiral LOFTUS. One was an influence mine which is the type that hit the U.S.S. *Princeton*. The other was a contact mine which is the type that hit the *Tripoli*. The *Tripoli* was back on line very shortly after that. She is on line now, as a matter of fact. The *Princeton* had voyage repairs done to her, and is on the way back to the States.

Senator EXON. The mine that hit the *Tripoli*, though, is one that——

Admiral LOFTUS. That was a floating contact mine.

Senator EXON. Isn't that one that is harder to explain how that happened than the submerged mine? We should have picked that up, shouldn't we?

Admiral LOFTUS. If you are saying, we should have better capability to pick up contact mines, my answer is yes. Of course, you are probably aware of several programs that are being developed today to do exactly that.

Senator EXON. Thank you, Admiral. General.

General JOHNSON. Sir, I certainly echo what Admiral Loftus has said. I would break it into a couple of things.

First of all, we did very, very well with the resources we had. I could talk forever about that, but I won't.

The two areas I would break it into are equipment and procedures. Equipment-wise, we have outlined the things that we need

to do. On the sealift side, more roll-on/roll-off ships and more access to ships there. On the airlift side, the C–17. On the integration, I think that in hindsight all of us could have gotten more ships quicker if we had had the vision we have today. We could have brought things on a little quicker. That is only marginal and should not deter from the great work that MARAD, the Navy, and others did in finding ships.

We also recognized, since we are on the international market, that we had partners not only in providing ships, but using ships. In the critical time that we needed more ships, December/early January, the British also needed ships. Since they were partners, that was certainly a good use of the world market ships. Integration-wise, we might have phased the move a little better. Quite frankly, on phase two, we pushed things to the end that, looking back, we should have worked hard to move them up front.

Senator EXON. Thank you, Captain.

Captain LEBACK. Well, I think I would tend to agree with General Johnson and Admiral Loftus.

One of the areas, in looking back at it, is that RO/RO situation. I think in the high point in moving cargoes, we had some 50 or 55 RO/ROs engaged in that. They certainly are highly productive, throughput-type vessels that can be utilized very effectively. General Johnson had testified earlier on the C–17s, on their capability of increasing airlift. RO/ROs certainly have the capability of increasing sealift, and they are very versatile. I certainly, looking back at it, would support and do support the need for more of those in the composition of the Ready Reserve Force.

Second, one of the problems that we need to look at is to level out and stem the decline of our ship repairing and shipbuilding base. That is essential if we are going to do something.

Also, just sitting here listening to you and your very deep interest in that counter-mine measures and whatnot, even though we build up our counter-mine measure equipment and capability, we also may want to consider the acquisition within the Ready Reserve Force several submersible vessels that can bring those minesweepers out there in the shortest period of time.

Admiral Donovan was somewhat criticized in the early part of Desert Shield on requisitioning or chartering a submersible foreign-flag vessel that transported the minesweepers and other small craft that were vitally needed in the theater, and we ought to consider that. We have to take a look, as Admiral Loftus said earlier. The mobility study that is coming out in November has to be carefully looked at as to what we really need in the area we want to go to.

Senator EXON. Well, thank you. When I hear you say what you say, I remember many, many years ago when we probably never thought we would be involved in an operation like this, we were concentrating primarily on resupplying Europe in the case of a Soviet attack. The then-chairman of the committee called me in and asked me to take a look at this whole matter of fast sealift, and we came up with a proposal that was not very enthusiastically received by anybody.

I am very pleased to report that testimony that we have had here indicates that the fast sealift ships did do a tremendous job.

That was a logistics miracle that our forces performed, and all of you had a key role to play in that. So, more fast sealift and more roll-on/roll-off capability seems to be absolutely critical, which leads me into my next question with regard to projection of forces which that is a very important part of.

It seems to me with the reduction in our force structure that we obviously are going to go through, that very logically means to me that we are going to have less bases 20 years from now than we have today. I will not go through and mention the bases that are under threat today, but you know the ones of which I speak. It seems to me, though, that is simply saying that projection of forces becomes even more critically important as we look into the future because we are not likely to have the bases for the prepositioning of certain material.

Additionally, with regard to projection of forces, I think that we have to look at that from the standpoint of supposing we did not have as many meaningful bases around the world 20 years from now. I am not saying that is going to happen, but I think that is the trend, downward. Does that not lead us into some discussion of the C–17 aircraft which I understand was not treated very well in the House of Representatives with their bill? Is that correct?

General JOHNSON. Sir, they decreased the 1993 number from 12 to 6. They had six in 1992 and six in 1993. We believe strongly that if you are ever going to have a ramp up, now is the time to do it, 6 in 1992, 12 in 1993. Otherwise, it was treated fairly well by the House.

What you say is absolutely correct, sir. As we pull back from forward deployed type forces to forward presence, lift in general becomes much more important. It is very, very difficult not to have the foreign bases. It is essential that we have foreign access. We have to have passage rights. We have to have landing rights and overflight rights, and transportation I believe will become even more important as we pull back from forward deployed forces.

Senator EXON. General, let me ask you this question. Our active fleet today with regard to the area that we are talking about is presently split approximately 58 percent Active duty and 42 percent Reserve and Guard duty. With the drawdown of the active duty structure in the next 5 years and the retirement of aging cargo planes, do you see this Active-Reserve mix shifting more to the Reserve?

General JOHNSON. Sir, before answering that question, I must tell you that the Guard and Reserve and the Naval Reserve and the Army Reserve and Guard participated very, very well and were total partners in everything we did. But, on the other hand, I must tell you when the fighting stopped, the employers and the spouses wanted the Reserves home again, as did many in Congress. So, when we think about putting more and more in the Guard and Reserve, we have to realize that that is good for the big war, and as long as we have that focus, it works very well. Tremendous patriots. We cannot expect them to stay on Active duty all the time. If we did, they would be Active duty. So, by increasing that number, I think we would be making a big mistake.

I know all of you get letter writing campaigns, but there's one I am dealing with because someone promised to release a unit early.

I am leaning forward to release those units as soon as we possibly can, and we are releasing them.

We have to remember the Guard and Reserve are very quick to volunteer, but their employers and spouses expect them home again when the conflict is over. We in the transportation community have not finished our job. We have less than a third of the cargo home. We are doing pretty well on passengers, but there is a lot left to be done, and we have to do that with Active forces.

Senator EXON. Mr. Chairman, my time is up. I have one more question. May I continue?

Senator Kennedy [resumes chair]. Please.

Senator EXON. With regard to projection of forces and along the lines that we have just been talking about, probably 20 years from now, I think we would most agree that we are not going to have any more capacity for facilities being established overseas, which means more and more on projection of forces, we are going to have to be looking at launching whatever we launch from here, which brings me to the B–2 bomber.

Does not the need to project forces a greater distance emphasize the necessity for a B–2 bomber for both conventional and nuclear deterrent concepts?

Does not that make the B–2, assuming it jumps through the hoops of performance that this committee, the Armed Services Committee, has provided for—wouldn't it be logical to assume that if we are going to have fewer facilities in advanced trouble spots, that we had better have more facilities or more adequate facilities than we have now for long-range strikes or the threat of strikes in the United States which the B–2 would certainly provide?

General JOHNSON. Sir, our President very wisely and prophetically pointed out on August 2 three things that our military must have as we go forward: one, that we must depend on our technological superiority; two, that we must have a ready force; and three, we must have a global reach to reach out and touch any part of the world. In the business we are in, we obviously play a big role in that third category, the second category and the first one, and certainly the B–2 plays a role in all of those, especially the first and the third. Our country needs the capability, which we provide from a transportation standpoint, to go anyplace in the world that we need to go and do the job. I think the B–2 certainly fits in that same category.

Senator EXON. Just one comment, if you want to comment on it, you might, Admiral. It seems to me that when we are talking about projection of forces, also we should realize and recognize the key role that the carriers are going to have in this area also the Trident. Those are two things that we can maneuver and project basically from here without the critical necessity of foreign bases. Is that not accurate?

Admiral LOFTUS. It is accurate, Senator. And, of course, I think that this committee is well aware of the impact of the two carrier battle groups that were in the region, in the AOR, when this whole operation started. It is my sincere belief that those carrier battle groups made Saddam Hussein blink and not go any further than he did. So, I would agree with that.

I think it is also appropriate, since this is a sealift hearing, to state that the process that we used in logistics support of the forces at sea was validated. Sending battle groups forward fully equipped to sustain themselves for 30 days and fight in any kind of situation is a concept that this committee has supported, as well as the House, and it worked perfectly well throughout this whole episode.

Senator EXON. Thank you, gentlemen.

Thank you, Mr. Chairman.

Senator KENNEDY. Thank you very much.

Let me just continue on that point, Admiral. Of course, the battle group was really designed with the idea that the conflict would be with the Soviet Union. Have you learned anything in terms of the Gulf with the different changes in the kind of configuration or the nature of the challenge? Do you need the types and the numbers of support ships that were really designed and developed in the whole group to deal with the northern Atlantic Soviet threat?

Admiral LOFTUS. I think that the numbers and types of ships, Senator, matched pretty much what the requirements were. In Admiral Arthur's debriefs, when he came to the Hill, I think he addressed that specifically, basically stating that he had the kind of repair facilities, the kind of ASF support, and the kind of fuel support that he needed based on the logistics type forces that were with them. All of that was augmented, I think beautifully, by the kinds of systems and airheads and seaheads that TRANSCOM put together for the whole operation to the point we were able to get critical spare parts to the fleet in 2 days. That is an extraordinary operation which worked well.

Senator KENNEDY. I am not talking so much about the resupply and the spare parts, but whether in terms of their function, TRANSCOM needs more anti-mine capability and less in terms of fire power and other support ships that they have.

Admiral LOFTUS. In the very beginning stages, Mr. Chairman, it was very important that the two carrier battle groups with their power projection forces were among the very few forces that were in the Gulf as the Iraqis came through Kuwait. Without those power projection forces, I am not sure what would have happened. I do not think any of us can predict whether or not it would have stopped there or gone further, but clearly they made a difference.

Senator KENNEDY. It probably made the greatest difference in the early days, less difference perhaps as the military buildup took place.

Admiral LOFTUS. As I think it should be. As the Army and the Navy established themselves in the theater and became the principal advocates in the air and ground war, as a matter of fact, that is exactly the way the system is supposed to work.

Senator KENNEDY. Again, my apologies to you for my being away for so long this morning. I did not know that Senator Hollings was going to go on quite as long as he did. As all of us know, he can.

Some of these areas have been touched on. I do not have a lot, but I would like to get some elaboration.

Senator Cohen pointed out the extraordinary record of all of you in the Gulf, and I certainly want to add my own commendation to

the very superior quality job that was done by all of you and the men and women who are supporting your mission.

Let me ask you each perhaps to react to a few questions. This was the first activation of the maritime prepositioning ship force, the fast sealift ships, and the civil reserve air fleet, the CRAF program, and it was the first large activation of the Ready Reserve Force ships and the first time TRANSCOM managed a large wartime deployment.

I am interested in some of the important lessons that were learned. I think General Johnson mentioned earlier the capability of the port facilities and also the airports there, which would clearly be different in different parts of the world. If you could look at this, what do you think the important lessons were? What do you think were the things that we ought to focus on in terms of the shortcomings or potential shortcomings? Maybe each of you could respond.

General JOHNSON. On the activation, sir, with the resources that we had available and the vision, we did very, very well.

Looking back in hindsight, we would do things a little differently. One, we would act a little more quickly. Two, in the case of the maritime, the RRF, we would have a little better handle on how quickly we can really activate the force. Captain Leback talked earlier about the fact that we could have not, from a shipyard standpoint, brought out all the ships at once, nor could we have loaded them. We had more ships in the 5-day category than we could have handled. The maritime prepositioning ships I think anyone——

Senator KENNEDY. Just before leaving that, maybe, Captain Leback could chime in.

In the RRF, you are not really talking about activating them all at one time in any event. You have the 5-day, 10-day, and 20-day readiness categories. As I understand, DOD never planned to call them all at once in any event.

I suppose the real question is could MARAD have come close to meeting the 5-day, 10-day, and 20-day phasing?

General JOHNSON. First of all, if we had an all-out war in Europe, we would have tried to activate all of them, in essence, at the same time. The answer is no, but I will let Captain Leback defend the fact that we would not activate them all at once.

Captain LEBACK. It would have been quite evident that had we had an all-out war or an emergency, that the decline in the shipbuilding base and the ship repair base would not have permitted us to get those vessels out in the 5, 10 and 20-day categories.

Now, in the 5-day category, which 66 percent of the ships were in, the lesson we learned there was that we had not activated those ships on either a test activation or a regular programmed activation over time. In fact, only 23 of the ships out of the 96 had ever been test activated prior to Desert Shield.

We need to look at a program that says it is going beyond this year's budget and have a goal to set on how we want to maintain those ships in the most efficient state possible. We do know that we will put them back in the fleet into reserve status with all known deficiencies, problems, repairs, and enhancements corrected so that when the next time comes around, we will have less problems in activating them.

We also need to look at the manpower situation.

Senator KENNEDY. Yes. Well, I will come to the manpower in a minute.

In terms of the 5, 10 and 20 days, what is your ability to meet those particular goals? What did we really learn? I guess one of the things you learned is you have to continue to test them or examine the ships themselves in terms of their capability more effectively than we have in the past, but what are the other lessons?

First of all, could you have gone for what was planned, the 5, 10, 20 days—could you have met that goal? And if not, how close could you have come to it?

Captain LEBACK. We could not have made the 5-day goals. That is almost impossible the way the fleet was dispersed through the reserve sites and the minimum number of ships out-ported. We found in the Gulf, for example, the vessels coming out of Beaumont, that we lost over 50 percent of the time of the 5-day activation in repositioning the ships in the repair facilities and then doing the 24-hour sea trial. It took us anywhere from 30 to 42 hours to move the ships physically from the Beaumont site to repair sites in Galveston, Houston, Mobile, New Orleans, and Tampa. That has to be looked at. If we are going to stay on a 5-day period, that means we have to put the ships in the ports where they have the repair facilities so that we can meet the 5-day standard. If we put them in the three reserve fleets, that is impossible to do. We just do not have the time if we are constricted by towing and trailing.

Senator KENNEDY. Now, what about the manpower?

Captain LEBACK. The manpower. We have to take a very close look at that. There has been a considerable amount of discussion raised on it, about the declining manpower base. We must not forget that when we bring new ships into the commercial sector, we are reducing the crew requirements on those ships because of their automated and highly efficient systems. The average crew requirement on existing RRF ships, which average about 24 or 25 years of age, is in the 30 to 34-man range. In the commercial sector, particularly in the high capacity container ships, the very efficient tankers that we operate, and a number of the RO/ROs, we are down in the 21-man crews.

So, even when we expand and improve the commercial sector with new ships, we are going to be reducing the number of billets available to U.S. seamen, and we have to look at how do we then come up with a program that takes care of the Ready Reserve Force. We are pretty close to solving that problem between MARAD, TRANSCOM, and the Navy.

Senator KENNEDY. Well, we will be interested in following the progress on that.

General Johnson, I interrupted your comments earlier I guess when we went over to the sealift. Is there anything further? Then we will hear from Admiral Loftus.

General JOHNSON. I was going to give your committee and certainly the Navy and the Marine Corps a kudos for the maritime prepositioning ships. I do not know that anybody could find anything wrong with that operation. It worked very, very well.

The fast sealift breakout went well too. Unfortunately, we had a casualty with a boiler on one of them. The seven remaining fast sealift ships carried more than 122 World War II ships would have carried during the same time period. So, a tremendous contribution there.

Senator KENNEDY. I figured out 9,000 miles in 14 days to be about 26 knots. What was the general speed?

General JOHNSON. The highest speed for a single voyage was 27 knots. The average speed for the fast sealift ships were 22 knots. That has to do with, obviously, weather conditions, canal passage, and others. Twenty-two knots was about right. I think everybody now agrees that 25 knots is about the right speed for a sealift ship when you look at all factors from propulsion to sea conditions and so forth.

Senator KENNEDY. Admiral.

Admiral LOFTUS. Senator, I have only to add that the investment that was made during the 1980s paid off handsomely during this whole operation. I am talking about building the RRF, acquiring the MPS, afloat prepositioning ships, hospital ships, TAVB's; it all was there when it was needed. Despite some of the shortfalls, it was an outstanding operation.

Senator KENNEDY. I think you would want to agree, though, that there were certain aspects. Obviously, the preposition worked well, and the fast sealift worked well. There were, obviously, in some areas more problems than other areas. Admiral.

Admiral LOFTUS. There is probably a danger in not looking at the lessons not learned in this, and I think General Johnson has explained the scenario-dependent operation that we were working with, the port facilities in Saudi, not having to fight your way in, et cetera. If we had not lifted heavy units out of Europe, if we had to lift them out of the United States instead, if there had been some sort of opposition, time lines would have changed considerably—so, I think in all of the lessons learned that we put together on this, we have to be careful that we do not become too confident of our abilities.

Senator KENNEDY. General Johnson, back to the C–17 program. I know Senators McCain and Dixon talked with you briefly about it.

As I understand it, the contractor has rephased the industrial effort to avoid any production gap and that the first flight of the first test craft, called the T–1, may actually occur next month. That is what the schedule showed last year. Is that right?

General JOHNSON. That is correct, sir.

Senator KENNEDY. I also understand that the first flight of the first production aircraft, the P–2, has slipped from last year's schedule of September into the November–December time frame. Is that correct?

General JOHNSON. I think so. I do not have the exact date, but it is the September time frame as I understand it.

Senator KENNEDY. Well, is it your understanding that there has been a slippage in that September test flight?

General JOHNSON. I am not aware of the exact date.

Senator KENNEDY. Would you check on it for us?

General JOHNSON. I will provide that.

Senator KENNEDY. Would you check on it? Then I would like your assessment about whether there is any cause for any further problems with the production program. If you would be good enough to provide that for us.

General JOHNSON. Yes, sir.

[The information follows:]

During the recent contract restructure, the System Program Office (SPO) negotiated a P-2 first flight of December 91. The current SPO estimate indicates P-2 production assembly is one month behind schedule. However, with proper application of resources, the contractor should meet the new schedule for first flight of P-2 in December.

Senator KENNEDY. General Johnson, Secretary Cheney testified last year that the decision on the major aircraft review cut the C-17 from 210 to 120 aircraft because he intended to cut the airlift program goal. Is there any information coming out of the current Mobility Requirements Study that would affirm or contradict this conclusion, that the airlift should be cut 6 million ton miles per day?

General JOHNSON. Sir, I have not seen even interim airlift results. I would expect, as they look at the various scenarios, that it will again be a tradeoff in the final number. I would be surprised if it is not higher than the current 48 million ton miles per day.

The Secretary, when he spoke to Congress, indicated Congress in its wisdom may decide 5 to 6 years from now to keep the production line open to buy more of this capability. I think that is still applicable in his mind and certainly in my mind, sir.

Senator KENNEDY. Well, that is what we are trying to find out. We saw what the need was in the Gulf where fast sealift was very, very important, and now we see the capability of the C-17. We have to put this in some kind of a balance. If the ships are only going to go 24 knots, they are not going to go as fast as 33 knots, and yet you want a lot of things there. So, we are going for C-17s. Then we are cutting back on the C-17s. Some of this has to be put into some kind of a framework where these different elements are in balance and proportion, and I think not being decided independently, which is clearly your central challenge. That is what we are kind of grappling with because you have a lot of different elements. You are making some requests and designing programs in terms of the future, and how do they all interrelate with each other is obviously the key.

General JOHNSON. We expect the Mobility Requirements Study to do exactly that, and we are very hopeful.

Senator KENNEDY. You can make the point that if you had more C-17s, you might have gotten to the Persian Gulf quicker. So, I think you made that point. That is what I am very much interested in—in trying to be able to put it into some proportion.

General JOHNSON. Yes, sir. We do need your support when you look at the House mark on the C-17. The administration requested 6 in 1992 and 12 in 1993. The House went six and six. We believe we need a ramp up. Now, the final number, as Secretary Cheney mentioned, can be decided later, but we need to ramp up as planned.

Senator KENNEDY. Well, we will certainly give you the assurance that we will look at that. If we are able to find out about the sched-

uling issues, those would be very important I think in terms of trying to move——

General JOHNSEN. Along that line, sir, for right now I can tell you that there are no technical issues. The Secretary of Defense's Office has looked very carefully at the financial issues and finds no open financial issues. Certainly there will continue to be challenges in that program, as all other programs.

Senator KENNEDY. Well, maybe you could check with the contractor and find out for us exactly the schedule.

The Congress provided the funds to the Navy to help reduce the uncertainties related to choosing the fast sealift ship, technology and deployment in the future, the so-called surface effect cargo ship. You have talked about it already, but I was wondering how much more funding would be required to complete the research and the development activities contemplated in the original report to the Congress.

Admiral LEHREE. Mr. Chairman, the response in 1989 and 1990 indicated that it looked like that was going to be a 2-year effort of about $30 million. Since that time we have really taken a two-phased approach in the R&D arena. The mid-term and near-term approaches basically concentrate on a monohull with gas turbine or diesel propulsion. The far-term efforts in surface effect and semi-planing hull forms have some risks associated with them, and we are looking at that now. The basic conventional is going to be for the mid-term 1998 time frame.

Our original estimates look pretty good at $30 million. With the use of the $15 million that we have now, it makes for about a $45 million program.

Senator KENNEDY. Are there other areas of uncertainty that you believe should be addressed by such R&D efforts?

Admiral LEHREE. I think we have them pretty much covered in the response that we gave.

Senator KENNEDY. General Johnsen, last year you and Mr. Bertram testified on the progress in implementing the national sealift policy through the Policy Coordinating Committee. You also testified that "the continued erosion of U.S.-flag sealift capability is clearly a national problem which requires a national solution." Your testimony said, "We are in the process of making recommendations from that task force to the National Security Council Policy Coordinating Committee on emergency preparedness and mobilization planning."

What actions have come from the committee since last year to produce any recommendations upon which Congress could act to help alleviate the problem you identified?

General JOHNSEN. Sir, I can tell you that we have presented those proposals. Captain Lehnes is the sealift leader of the administration on the Policy Coordinating Committee, and perhaps he can add something.

We have not gotten the cooperation nor the movement that any of us would like, sir.

Captain LEHNES. It is not moving as fast as we would like, as General Johnsen said. We have been looking at it. We are going back on several issues. We are also waiting on one tanker to see what the MRS comes out with the latter part of the year, but it is

essential that we get back on track with it and get the reports back that were required.

Senator KENNEDY. Where is the bottleneck? Is that at the NSC, or what is it?

Captain LEBACK. I don't believe it is there. Admiral Pilling has done a very good job on it. I think he is just trying to get us all back and focused on where we need to go.

Senator KENNEDY. Well, we would like to know what the committee is recommending and what they have done and what has not been done.

Captain LEBACK. Excuse me. We could provide you with a report and an update on that.

Senator KENNEDY. Would you?

Captain LEBACK. Yes, we can do that.

Senator KENNEDY. Would you do that as soon as possible? We will look forward to that.

[The information referred to is retained in committee files.]

Senator KENNEDY. Thank you very much. The committee stands in recess.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR EDWARD M. KENNEDY

OPERATIONAL PLANNING

Senator KENNEDY. General Johnson, your prepared statement (page 9) says "the operational plan governing a Southwest Asia contingency was not fully developed, and was not made transportation feasible." If I understand what this means, this is a devastating indictment of a planning process that had not come up with operational plans for a contingency in a region that had been declared by the President to be vital to U.S. interests over 10 years ago. This declaration was in fact why the President created the Rapid Deployment Joint Task Force (RDJTF), which was the forerunner of the Central Command.

Why should we have any confidence that the planning for other contingencies have been fully developed, or that the planning process does not need major overhaul?

General JOHNSON. An Operations Plan (OPLAN) based on past threats and a different scenario for a Southwest Asia (SWA) contingency does exist, and has for many years. Based on changing strategic realities of the past 2 years a new concept of operations was being developed and had not yet been refined when Iraq invaded Kuwait in August 1990. Although forces had been determined, transportation refinement to time-phase their deployment had not been accomplished. The new SWA concept was scheduled for refinement in October 1990. When Operation Desert Shield was initiated, USCENTCOM and USTRANSCOM were forced to refine the SWA OPLAN on the fly.

On the other hand, all other major OPLANs have undergone several cycles of refinement and are mature plans. OPLAN development is a meticulous and interactive process accomplished on approximately a 2-year cycle. A supported CINC enters the OPLAN refinement process with a concept of operations and apportioned forces. As the process continues, the supported CINC determines sustainment requirements, then time-phases the deployment of forces and sustainment to support the overall concept within lift constraints. Throughout this process, USTRANSCOM hosts refinement conferences to validate force and sustainment requirements and ultimately ensure transportation feasibility. Based on real world execution experience, USTRANSCOM has confidence that the current tools and processes used in deliberate planning produce realistic, credible plans. There are also efforts underway to make planning more responsive. These initiatives include an adaptive approach to planning which will result in a reduced time line from concept development to plan finalization, and enhanced computer application in the refinement/analysis of OPLANs. Additionally, since every contingency cannot be covered by a plan, automation is playing a big role in our ability to generate timely, executable plans in response to the "no plan" situation. We are developing the capability to quickly build and tailor existing notional force packages, based on the warfighting

CINC's selected course of action, that effectively respond to a specific crisis or contingency. USTRANSCOM is taking the lead in working with the warfighting CINCs to field that capability in the near future.

REQUIREMENTS DEVELOPMENT

Senator KENNEDY. General Johnson, in response to a question at the hearing today you testified that requirements for the C–17 performance had been adjusted to reflect a more realistic assessment of what was really needed. Specifically you mentioned the load requirement of carrying 167,000 pounds for a distance of 2,400 nautical miles being changed to a requirement of carrying 160,000 pounds over the same distance and the load factor for landing being reduced from eight "G's," or eight times the force of gravity. If the requirements were not important in the first place, why were they originally set at those levels?

General JOHNSON. MAC's requirement for the C–17 aircraft is based on joint-service needs to airlift personnel and materiel in support of JCS war plans. The Mission Element Need Statement (MENS) for the C–X identified fundamental aircraft capabilities including range, airland/airdrop of outsized equipment, air intercontinental refueling, and operation through small austere airfields, all at the lowest life-cycle cost. In 1980 a Request for Proposal (RFP) based on the MENS was released to industry. This document requested an industry design solution to provide the required military capability. By winning the competition, McDonnell Douglas's C–17 performance capability became the basis for contract specifications. During the late 1980s changes occurred in the acquisition system which mandated users create thresholds (minimum acceptance capability) for all major programs. In the fall of 1989, at the direction of the Chief of Staff of the Air Force, MAC and the Air Force Systems Command (AFSC) reviewed C–17 design parameters to identify cost drivers and establish thresholds. During Lot III negotiations in early 1991, MAC was informed by the C–17 System Program Office it was necessary to make minor adjustments to align contract specifications to the established MAC thresholds I mentioned earlier. Since these adjustments dealt only with range/payload specifications and did not breach MAC's thresholds, we did not object. No adjustments were made which reduced the C–17s fundamental capability, including delivery of large, outsized loads into short runways, nor requirements established by the C–X Joint Task Force. The present C–17 aircraft design and performance specifications meet all MAC user requirements.

Senator KENNEDY. What steps can be taken, if any, are that the government is not arbitrarily signing up to standards that are not necessary and may not be achievable, but will certainly cost us more at a time we can ill afford such mistakes?

General JOHNSON. Steps are currently in place to reduce the probability the government will contract for unnecessary and unachievable weapon system capabilities. Early involvement of the using command is key to ensuring the contracted design solution meets established requirements without providing additional, needless capabilities that increase cost. Process changes by the using commands in the late 1980s to develop their requirements are showing a positive effect. Throughout the span of an acquisition program (development, testing, and production), requirements are constantly reviewed and evaluated against cost and schedule impacts. As an example, the C–17 has undergone a number of requirements reviews. The most recent, directed by the Chief of Staff of the Air Force, eliminated or reduced a small number of capabilities while validating the basic aircraft design. Careful and continual development, tracking, and review of user weapon system requirements reduce the chances that inflated user needs will increase cost.

MAINTAINING AIRLIFT CAPABILITY

Senator KENNEDY. General Johnson, earlier this year before the full committee, Secretary Cheney said that we were "flying the wings off of the C–141 aircraft." Secretary Rice also provided the committee information earlier this year which indicated that retirement of older C–141s may cause a "bathtub" in capability in the next several years.

Given the potential short-term reduction in capability and the fact that the Mobility Requirements Study could very well recommend increasing airlift capability above current levels, wouldn't it be prudent to take steps to maintain the C–141 fleet at current levels?

General JOHNSON. The C–141 fleet is indeed rapidly reaching the end of its design service life. Retirements over the next 10 years will be necessary, but these retirements are tied to C–17 deliveries to avoid a reduction in airlift capability. In order to preserve as much C–141 service life as possible, we have taken several steps to

reduce the severity of aircraft use and the number of hours accumulated annually. But even with these steps, it will be necessary to retire approximately 118 aircraft over the next 10 years due to service life considerations. It is not advisable to maintain the current fleet of C-141s due to the high cost of implementing a complete service life extension program and the absolute necessity to modernize the strategic airlift fleet. The C-17 has been shown to be the most cost-effective means for acquiring airlift capability. Once the Mobility Requirements Study is completed we will have a better idea of what course of action to take as we move beyond the current budget cycle.

ANALYSIS OF POTENTIAL C-17 CONTRIBUTION

Senator KENNEDY. General Johnson, you have widely quoted a Military Airlift Command white paper which claims that replacing some of the C-141 fleet with the C-17 would have cut 10 days off the first 45 day airlift effort supporting Operation Desert Shield. This analysis raises several questions. How much more capability would your analysis have shown that we might obtain if you had assumed that the 120 C-17s would be added to the current airlift force, rather than only being used to replace some of the C-141s that would be retiring?

General JOHNSON. One of the aircraft mixes analyzed was based on using 120 C-17s and the current C-5 fleet as the primary contingency aircraft. C-141s were used to accomplish the majority of the non-contingency workload and to supplement the C-5 and C-17 as much as contingency system constraints would allow. This analysis was based on the en route and offload structure encountered in Operation Desert Shield where, during the early phase, refueling capability and available ramp space limited the maximum number of aircraft on the ground (MOG). The results of this analysis show throughput in the first 45 days would have increased by 30 percent over actual Desert Shield performance.

Senator KENNEDY. Wouldn't a similar result be shown by the analysis if you added an "equal cost" number of C-5B aircraft to replace retiring C-141s?

General JOHNSON. No. In fact replacing C-141s with C-5s instead of C-17s would have decreased our actual throughput by 9 percent during the first 45 days of Operation Desert Shield. This is due to the fact that refueling capability and available ramp space constrained the maximum number of aircraft on the ground (MOG) during the early phase of Operation Desert Shield and allowed only a limited number of aircraft to be flowed into the AOR. The lower fuel requirements and exterior dimensions of the C-17 serve to magnify these constraints. Therefore, based on system flow restrictions, an "equal cost" number of C-5s could not have been fully utilized and would have resulted in a decrease in the flow of materiel airlifted to the theater.

ANALYSIS OF SEALIFT

Senator KENNEDY. Wouldn't there also have been some military utility in getting the sealift deliveries there somewhat sooner? In other words, can't you make a similar assessment of the utility of additional speed for fast sealift ships?

General JOHNSON. Yes, if all of our sealift assets could have averaged 22 to 25 knots, we could have improved force closure to the Gulf region. If we take Operations Desert Shield/Storm as an example and look at the performance of our fastest sealift vessels, the eight Fast Sealift Ships (FSS), we see that even given their 33 knot surge speed capability, they only averaged 22 knots per crossing. More importantly however, even with their speed, when you factor in breakout and loading time, it took 20 days for the first FSS to arrive in theater. The analysis you referred to shows the largest impact of the C-17 would have been in the critical first 12 days of the operation, while even our fastest sealift vessels were still en route from the United States and our forces were arguably at the most risk. Operations Desert Shield/Storm have once again demonstrated the complementary nature of airlift and sealift, with airlift providing the immediate lift required to move deterrent forces and sealift moving in the heavy combat force.

Based on our experience in Desert Shield, we found a sustained speed of 25 knots for strategic sealift ships would provide a balanced capability to meet projected Army surge deployment requirements and not result in large queues at the ports. That speed is toward the top end of today's diesel technology. At present, speeds greater than 25 knots would be significantly more costly to build and operate and would likely require additional R&D. Since affordable fast sealift would provide some additional flexibility and improve force closure, we support continued efforts by this committee and the Navy in the area of fast sealift technology research and development.

CONTRIBUTION OF FAST SEALIFT

Senator KENNEDY. Admiral Loftus, a number of officials have testified about 25 knots as being fast enough for new sealift ships, based on our recent experience in the Persian Gulf of operating our converted SL-7 ships at speeds below their maximum. Weren't operations of these ships constrained because of other factors?

Admiral LOFTUS. Yes, they were. When the SL-7s were designed, they would do 33 knots with a draft of 31 feet. During Operations Desert Shield/Storm, their loaded drafts were as much as 37 feet resulting in a slower speed. Other factors affecting speed were weather, sea-state, currents, the un-refueled range limitation at full power, and the restrictive speed through the Suez Canal.

Senator KENNEDY. Would there have been any military utility in getting there somewhat sooner?

Admiral LOFTUS. Certainly, getting the cargo in theater sooner is preferable. However, there are various options to provide earlier delivery; more preposition ashore or afloat or more airlift as well as faster sealift. Improvements to intra-CONUS and intra-theater movements will also decrease the time required to move from "fort to foxhole." The Mobility Requirements Study (MRS) is being conducted to evaluate where we should invest the marginal mobility dollar. Until we conduct risk and trade-off analysis of the many available options within the movement chain, we cannot be assured that the high cost associated with faster sealift will provide the best payoff. The difference in delivery time to the Persian Gulf at 30 knots vice 25 knots is only 3 days.

QUESTIONS SUBMITTED BY SENATOR ALAN J. DIXON

MOBILE OFFSHORE BASES

Senator DIXON. The concept of mobile offshore sea bases potentially offers considerable advantages to land based prepositioning of military equipment. Afloat prepositioning equipment in international waters may avoid sovereignty issues and preserve flexible response. Would not this concept complement airlift and sealift alternatives?

General JOHNSON. To ensure we maintain the balanced mobility system of airlift, sealift, and prepositioning which worked so well in Operations Desert Shield/Storm we must be careful not to look at any one leg of the mobility triad in isolation of the others. The question of prepositioning, including determination of what equipment, the quantity, and potential location (i.e. which theater and afloat or ashore) is being addressed through the ongoing Mobility Requirements Study (MRS). From the perspective of USTRANSCOM, some increased level of prepositioning makes sense. Prepositioning has been shown to be capable of providing early delivery of unit equipment and sustainment into a theater during conflict. While the MRS will not be looking specifically at new prepositioning technology like the Mobile Offshore Base, the concept appeared to have some merit and was referred to the Under Secretary of the Army, the primary customer for prepositioned material, for consideration.

Senator DIXON. How viable is this alternative to prepositioning material and supplies on land (Middle East)?

General JOHNSON. The Mobile Offshore Base concept embodies strong and weak points which ought to be considered by the services before they select a specific prepositioning technology. Issues such as host nation support for prepositioning, political and physical threats to prepositioning ashore versus afloat, relative mobility of prepositioned assets, and relative costs must be considered. While the Mobile Offshore Base concept appears feasible, it should compete against other prepositioning options like the Maritime Prepositioning Ships and Afloat Prepositioned Ship concepts which worked so well in Operations Desert Shield/Storm.

Senator DIXON. Would not this concept enhance our ability to transport a total force on short notice over long distances?

General JOHNSON. The Mobile Offshore Base concept's advertised capability to provide offshore warehousing in international waters is both a strength and weakness. While it avoids potential host nation political restrictions and security constraints, the relatively stationary platforms must withstand storms at sea, will represent potential targets for terrorism, and must be downloaded to scarce shipping resources for movement of equipment to shore. The Mobile Offshore Base runs the risk of being positioned in the wrong theater to support a contingency and adds no lift assets for follow-on-deployment or redeployment operations. From our perspective, ships are the optimum means by which to provide afloat prepositioning. Ships are able to move to any theater of operations where equipment may be required and

can be reutilized in the common user sealift pool to move additional materiel once they have discharged their prepositioned cargo.

PREPOSITIONING

Senator DIXON. The concept of mobil sea bases potentially offers considerable advantages to land based prepositioning of military equipment. Afloat prepositioning equipment in international waters may avoid sovereignty issues and preserve flexible response. Would not this concept complement airlift and sealift alternatives?

Admiral LOFTUS. Yes it would. The Maritime Prepositioning Ships (MPS) demonstrated during Operations Desert Shield/Storm rapid response while maintaining flexibility of use in any theater of operation. These ships also enhance our lift capability by being able to return to CONUS for a second trip to theater during surge operations.

Senator DIXON. How viable is this alternative to prepositioning of materiel and supplies on land (Middle East)?

Admiral LOFTUS. Afloat prepositioning of equipment in international waters does avoid sovereignty issues and preserves flexible response. Afloat prepositioning also adds additional surge assets in that they can return to CONUS after their initial offload for a second delivery to theater. The Mobility Requirements Study (MRS) is looking at afloat prepositioning as an option in the mobility equation.

Senator DIXON. Would not this concept enhance our ability to transport a total force on short notice over long distances?

Admiral LOFTUS. Having a substantial amount of key equipment, supplies and ammunition prepositioned afloat would enable rapid response of a deterrent force much sooner than movement from CONUS.

C–17

Senator DIXON. General, the events of Desert Shield/Storm have reinforced the need for an ability to respond rapidly and decisively to emergencies throughout the world. The C–17 is the key to a modern and responsive airlift force. Given this requirement for airlift, please comment upon the need to provide long lead procurement funding in this bill (fiscal year 1992) for 12 aircraft in fiscal year 1993.

General JOHNSON. You are correct. Production of the C–17 is essential because it provides the Nation with flexible airlift capabilities which we do not have in the current airlift fleet. Buying 12 aircraft in fiscal year 1993 is an important, carefully timed step toward sustained production of the C–17. This represents a reasonable, fiscally constrained number to maintain the present unit cost. Buying fewer than 12 aircraft in fiscal year 1993 would upset a carefully planned and negotiated schedule. If a substantial reduction were enacted, the unit cost of the aircraft will further increase.

C–17 CONTRACTOR PERFORMANCE

Senator DIXON. There are indications that the contractor has turned the corner on production progress. What is the situation with regard to first flight of the C–17?

General JOHNSON. The Douglas Aircraft company is working 24 hours a day, making significant progress toward achieving a successful first flight this summer. Their attention is being focussed on the quality and efficiency of production as well safety to ensure that upon completion of first flight the aircraft can move directly into the flight test phase at Edwards Air Force Base.

Senator DIXON. What is your assessment of the contractor's ability to produce to the current schedule?

General JOHNSON. Contractor oversight is the primary function of the C–17 System Program Office (SPO). The SPO has advised us that Douglas Aircraft Company has made tremendous progress in the past year, but must continue to improve their efficiency to meet the schedule for Lot III and beyond. In the past year, Douglas has cut rework and repair with each successive aircraft and increased emphasis on subcontractor management. Both of these efforts will increase production efficiency and reduce cost. We have great confidence in DAC's commitment to the C–17 and to continuing to improve efficiency and reduce cost.

[Whereupon, at 11:40 a.m., the subcommittee was adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEARS 1992 AND 1993

FRIDAY, JUNE 7, 1991

U.S. SENATE,
SUBCOMMITTEE ON PROJECTION FORCES
AND REGIONAL DEFENSE,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

ANTISUBMARINE WARFARE PROGRAMS AND ATTACK SUBMARINE PROGRAMS

The subcommittee met, pursuant to notice, at 9:35 a.m., in room SR-222, Russell Senate Office Building, Senator Edward M. Kennedy (chairman of the subcommittee) presiding.

Committee members present: Senators Kennedy, Gore, Cohen, and McCain.

Professional staff member present: Creighton Greene.

Minority staff members present: Brian D. Dailey, Mark B. Robinson, Ann Elise Sauer, professional staff members.

Staff assistant present: Julie W. Kemp.

Committee members' assistants present: William J. Lynn, assistant to Senator Kennedy; Andrew W. Johnson, assistant to Senator Exon; Leon S. Fuerth, assistant to Senator Gore; Anthony H. Cordesman, assistant to Senator McCain; and Samuel D. Adcock, assistant to Senator Lott.

OPENING STATEMENT OF SENATOR EDWARD M. KENNEDY, CHAIRMAN

Senator KENNEDY. We will come to order.

The Projection Forces Subcommittee meets this morning to consider the Navy submarine programs and its antisubmarine warfare programs. As it has in its other hearings this year, the subcommittee will examine these programs in light of the dramatically changed international circumstances of the last few years. This new, post-Cold War international environment requires new priorities in defense programs.

Today, we will explore how these new priorities have been reflected in the Navy's submarine and antisubmarine warfare programs. Reduction in the Soviet threat has allowed the Navy to cut back on procurement of the new *Seawolf* submarine. Instead of building three *Seawolfs* per year, as originally planned, the Navy

now will build one per year. We want to learn how this reduced number of submarines meets our security needs.

We also want to explore the Navy's efforts to evaluate designs for a new nuclear attack submarine called the *Centurion*. In antisubmarine warfare, the end of the Cold War has focused attention on the threat posed by Third World diesel submarines, which often operate in restricted areas and close to shore. Many of the systems like the *Seawolf* that we have developed to meet the threat of Soviet nuclear submarines in more open oceans areas are not appropriate in shallow water.

Today's witnesses will describe the changes in the Navy's antisubmarine warfare strategy and programs needed to meet this new challenge.

We have three witnesses this morning: Hon. Gerald A. Cann, Assistant Secretary of the Navy for Research, Development and Acquisition; Vice Adm. James D. Williams, Deputy Chief of Naval Operations for Naval Warfare; and Rear Adm. Raymond G. Jones, Deputy assistant Chief of Naval Operations for Undersea Warfare.

Welcome to all of you this morning. We look forward to your testimony.

[The prepared statement of Senator Kennedy follows:]

PREPARED STATEMENT BY SENATOR EDWARD M. KENNEDY

The Projection Forces Subcommittee meets this morning to consider the Navy's submarine programs and its antisubmarine warfare programs.

As it has in the other hearings this year, the subcommittee will examine these programs in the light of the dramatically changed international circumstances of the last 2 years.

In that time, the Berlin Wall has fallen and Eastern Europe has begun to emerge from Soviet military domination. The Warsaw Pact has dissolved and the Soviet Union has reduced its defense spending. This reduction in the military threats that we face has allowed significant reductions in defense spending.

Iraq's invasion of Kuwait, however, proved that the world remains a dangerous and uncertain place. But the primary military challenges we face now are much different than those at the height of the Cold War.

Regional instability has replaced superpower confrontation as the focus of our defense planning. Asia, Africa and Latin America have emerged as the geographic center of our military efforts. And, Third World dictators like Saddam Hussein have superseded the Soviet Union and its allies as the primary threats.

This new post Cold War international environment requires new priorities in defense programs. Today, we will explore how those new priorities have been reflected in the Navy's submarine and anti-submarine warfare programs.

The reduction in the Soviet threat has allowed the Navy to cut back on procurement of the new *Seawolf* submarine. Instead of building three *Seawolfs* per year as orginally planned, the Navy now will build one per year.

We want to learn how this reduced number of submarines meets our security needs. We also want to explore the Navy's effort to evaluate designs for a new nuclear attack submarine—called *Centurion*.

In anti-submarine warfare, the end of the Cold War has focused attention on the threat posed by Third World diesel submarines, which often operate in restricted areas, close to shore.

Many of the systems, like the *Seawolf*, that we have developed to meet the threat of Soviet nuclear submarines in more open ocean areas are not appropriate to shallow water. Today's witnesses will describe the changes in the Navy's antisubmarine warfare strategy and programs needed to meet this new challenge.

American capability in undersea warfare has long been one of the pillars of our naval superiority. To retain our edge in this vital area, we need to restructure submarine and antisubmarine warfare programs to meet the threats of the new post Cold War environment.

We have three witnesses this morning.

- The Honorable Gerald Cann, Assistant Secretary of the Navy for Research, Development and Acquisition;
- Vice Admiral James Williams, Deputy Chief of Naval Operations for Naval Warfare;
- Rear Admiral Raymond Jones, Deputy Assistant Chief of Naval Operations for Undersea Warfare.

Senator KENNEDY. I recognize Senator Cohen.

Senator COHEN. Mr. Chairman, let me join you in welcoming Secretary Cann, Admiral Williams, and Admiral Jones. I am sorry that Admiral Bacon could not be with us today. I am told that he is doing rather well in recovering from a recent operation.

I will simply reiterate what the Chairman has said, and will focus principally on the *Seawolf* issue. Even though that is currently in litigation and we are somewhat restricted in what can be discussed, I think we are going to focus on, or at least will ask for your opinions and perhaps some advice about how we are going to reduce the costs of submarine construction programs.

This particular submarine, I believe, now consumes about one-fifth of the entire ship-building budget. It calls into mind the familiar "law of Augustine," which I have cited on many occasions, where Augustine said in one of his books that if we continue to procure aircraft in the fashion that we are, then by the year 2050 the entire defense budget will be consumed in acquiring one tactical aircraft, that will have to be shared between the Air Force and the Navy, except during Leap Year, and on that extra day they will allow the Marine Corps one day of flying.

Obviously, Augustine's tongue was deeply embedded in his cheek. But, nonetheless, I think we have to be concerned at a time when we are seeing severe reductions in our defense spending and a rather serious increase in program costs, we have to examine why this is so and look at follow-ons to the *Seawolf*. Senator Kennedy mentioned the *Centurion*. We are obviously going to be concerned about what kinds of platforms we are going to be able to build in the coming years that will allow us to reduce costs and, at the same time, maintain our lead in the field of ASW.

I look forward to discussing that and, as well, perhaps some issues about how well we are doing with transitioning projects from the DARPA advanced submarine technology program into the Navy, including the electromagnetic countermeasures launcher. It would also be helpful to hear your plans about acquiring new electronic components for the new sonar systems, including signal processors and displays.

Finally, I would like to have your testimony on organizational structure, especially regarding the nonacoustic ASW. We are getting into some of the competition between the labs and private companies, and I think we need some testimony on that.

I look forward to your testimony, gentlemen.

Senator KENNEDY. Thank you.

Before you proceed Secretary Cann, I will enter into the record the prepared statement of Senator Dixon.

[The prepared statement of Senator Dixon follows:]

PREPARED STATEMENT BY SENATOR ALAN J. DIXON

Mr. Chairman, it is a pleasure to have with us today Assistant Secretary of the Navy (Research, Development and Acquisition), Gerald A. Cann and Deputy Chief of

Naval Operations (Naval Warfare), Vice Adm. James Williams, and Deputy Assistant Chief of Naval Operations (Undersea Warfare), Rear Adm. Raymond Jones.

I look forward to hearing from our distinguished guests on antisubmarine warfare and attack submarine programs, especially in view of the recent dramatic changes in the world.

I want to ensure our Navy is capable in the future to answer any threats we may face.

I look forward to the testimony of our three distinguished guests.

Thank you, Mr. Chairman.

Senator KENNEDY. Mr. Secretary.

STATEMENT OF HON. GERALD A. CANN, ASSISTANT SECRETARY OF THE NAVY, RESEARCH, DEVELOPMENT AND ACQUISITION

Mr. CANN. Good morning, Mr. Chairman and distinguished members of the subcommittee. As you indicated, I have brought with me Vice Admiral Williams and Rear Admiral Jones to discuss the requirements both in ASW and undersea warfare.

I have a few brief remarks. I would ask that my full statement be placed into the record.

Senator KENNEDY. Your statement will be so included.

Mr. CANN. Thank you.

I would like to make a few comments, and then I would like to have Admiral Williams make some comments and then Admiral Jones.

As you know, the Soviet submarine fleet, despite overall military reductions in the Soviet Union, is actually increasing in capability. They launched 10 new submarines last year and continue to outbuild us three to one.

In addition, of the world's fleet of submarines, which numbers in excess of 750, nearly 400 are owned by countries other than the United States and the Soviet Union. Nineteen countries are currently producing submarines, and there are others who may soon be joining this group.

With this many suppliers trying to stay in business, submarines have become readily available on the international market.

These weapon systems will come more and more into play as regional issues become more likely to drive potential conflict. The advanced submarine threat is still very real, despite lowered tensions between the East and the West.

Future conflicts, including those termed "low intensity conflict," are likely to be fought with increasingly "high intensity" weapons. As you can well imagine, the same level of individual threat, and potential damage, is contained in all torpedoes and cruise missiles from the point of view of the ship that is being shot at, regardless of whether it is fired by a super power or a Third World country.

Our Navy of the future must be able to prevail against all threats. The submarines, ships and aircraft we are developing and building must be able to defend themselves against the threat individually, as a battle group, or as part of a joint operation.

There is little question that the United States requires a robust submarine force and must maintain a strong and credible ASW capability. The question is how to do this while downsizing the fleet to adjust to a changing world situation and a smaller budget. As you know, I cannot get into a discussion of the current litigation over the *Seawolf* construction program, but it should be noted that

what is at issue is that we are not buying the numbers of submarines required to support the industrial base, and it will take the wisdom of Solomon to divide the anticipated submarine contracts between the two competing shipyards.

We must not lose sight of the fact that, despite the current controversy, continued production of the SSN–21 class *Seawolf* submarine remains critical to the maintenance of our undersea superiority. The *Seawolf* represents a quantum leap in quieting, sensors, and firepower over the Improved 688 class submarines.

Seawolf will restore the margin of individual superiority traditionally enjoyed by U.S. submarines, a margin that has eroded over time due to the continuing improvements in Soviet submarines. We must continue production of the *Seawolf* to ensure that we can meet the evolving submarine threat.

In an effort to seek a more affordable complement to the *Seawolf*, the Navy has begun the *Centurion* study to define a new class of attack submarine. Along with *Seawolf*, this submarine would carry the attack submarine force into the multi-mission environment of the next century, entering service around the time that the first 688 class submarines reach the end of their service lives. A requirements review to define desired missions and characteristics for the new attack submarine is currently in progress. This review is in its final stages now, and I anticipate receiving the results shortly.

I would like to add, in response to the interest you expressed in your letter to me, Mr. Chairman, that the joint Navy-DARPA Advanced Submarine Technology Program and off-board sensor efforts included in the unmanned/autonomous underwater vehicle program are providing vital input to the design considerations of this next class of attack submarine. We are considering a wide range of design characteristics to make it both affordable and capable. The emphasis of these programs is on stealth, materials, new technologies and affordability. A major goal is to reduce the submarine's cost to the point where more than one submarine could be funded each year.

We hope to enhance the affordability of the new submarine by exploiting these advances in technology. There are many promising development efforts underway in the Advanced Submarine Technology Program that have the potential to help keep costs down while enhancing the new submarine's capabilities. Some of these technologies are currently being introduced into the *Seawolf* program, such as nonpenetrating periscope and others. Magnetic bearings, for example, are being tested on the research and development submarine, U.S.S. *Memphis*. We have a lot of good technology in hand from the *Seawolf* program and expect to pick up quite a bit more before the submarine resulting from the *Centurion* study is built.

Make no mistake: this will be a capable platform. We may end up configuring it to maximize performance for certain missions, but each platform will retain the capability or, if necessary, the ability to be reconfigured, as a premier open ocean anti-submarine warfare asset, capable of taking on any and all threats.

In other development efforts, the Navy has significantly increased its level of investment in nonacoustic antisubmarine war-

fare. Efforts under the cognizance of both the Navy and DOD have focused efforts on our four specific technology areas relevant to spaceborne, airborne, submarine-mounted and fixed-barrier ASW. There are some exciting initiatives ongoing in this area which show great promise. In fact, a helicopter-borne sonar detection system is in advanced development already, and a P-3 capable system will soon follow. Additionally, a submarine-mounted system is in advanced development.

Other nonacoustic developments in the areas of radar, optics, and electromagnetics are being vigorously investigated through extensive field tests and will enter advanced development as soon as appropriate.

As you are well aware, there has been a controversy over the development of an ASW stand-off weapon. We have a study in progress, due to be completed this summer, which focuses on the options for future weapons.

In another area of interest to the subcommittee, we have been investigating the applicability of air independent propulsion technology to U.S. submarine programs and to special purpose submersibles, especially to swimmer delivery vehicles, deep submergence rescue vehicles, and for applications in auxiliary submarine propulsion. Initiatives in this area include work in fuel cell development, advanced battery programs, and industry surveys on European developments, including the Stirling engine, closed cycle diesel and advanced battery technologies.

In fact, as recommended by Congress, we have an assessment team going to Germany next month to observe sea trials on the German submersible NARWHAL.

In a minute I would like, with the Chairman's permission, to have Admiral Williams discuss the Navy's ASW warfighting philosophy and how we plan to carry out our ASW strategy while downsizing the submarine fleet and ASW assets to reflect the current world situation and budget constraints.

He will also address the Navy's increased emphasis on littoral warfare and shallow water ASW, which is another area that you have expressed interest in.

He will be followed by Admiral Jones, who will have comments on submarine programs.

Before that, I would like to express the Navy's appreciation for the support that the Congress and this subcommittee have shown for Navy submarine and ASW programs in the past. It is clear that continued support will be needed to maintain both the level of maritime security and the sea-based power projection capability the United States enjoys today.

The Navy looks forward to your continued support to extend the excellent capabilities of our submarine and ASW forces into the next century.

Thank you.

I would like now to have Admiral Williams provide his comments.

[The prepared statement of Mr. Cann follows:]

PREPARED STATEMENT BY GERALD A. CANN, ASSISTANT SECRETARY OF THE NAVY (RESEARCH, DEVELOPMENT AND ACQUISITION)

On March 12, 1990 I was confirmed as the first Assistant Secretary of the Navy for Research, Development and Acquisition. My appointment was part of the Navy's implementation of the Defense Management Review and was a result of the Goldwater-Nichols Reorganization Act. Consolidating Navy acquisition functions into one office has allowed considerable economy and improvement in the efficiency of the acquisition process.

As the Navy's Acquisition Executive, I am responsible for all acquisition matters including research, development, production, shipbuilding and associated support programs. My primary function is to provide acquisition policy, procedures and oversight of the administration of all Navy research, development and acquisition programs. Following the establishment of a fleet requirement by the Joint Requirements Oversight Council (JROC), the Chief of Naval Operations or the Commandant of the Marine Corps, and after appropriate programming and budgeting of resources, full responsibility for transitioning the requirement into a piece of functioning hardware ready for operational test and evaluation and fleet introduction falls within my purview. My goal is to ensure that all programs are well run, technically feasible and adequately funded. The challenge of the coming year is to continue the progress we have made in increasing efficiency of the acquisition process while decreasing manpower requirements without adversely impacting program execution.

Operation Desert Storm demonstrated that despite the lessening of the Soviet threat, without the regionally stabilizing influence of superpower confrontation, current chances for armed conflict are as great or greater than during the period of "cold war." It is evident that our traditional foes are not the only credible threats to the interests of the United States. In a world where technologically advanced weapon systems are available on the open market this threat is substantial. Submarines, antiship cruise missiles and advanced tactical aircraft are present in all regions of the world. The Navy of the future must remain capable of answering all of these threats.

The Soviet fleet of submarines, despite overall Soviet military reductions, is actually increasing in capability. The Soviets launched 10 new submarines last year. In addition, of the world's fleet of submarines, which numbers roughly 750, nearly 400 are owned by countries other than the United States and the U.S.S.R.

Nineteen countries are currently producing submarines, and there are others who may soon be joining this group. With this many suppliers trying to stay in business, submarines have become readily available on the international market. These weapons systems will come more and more into play as regional issues become more likely to drive potential conflict. The advanced submarine threat is still very real despite lowered tensions between East and West.

Future conflicts including those termed "low intensity conflict" are likely to be fought with increasingly "high intensity" weapons. As you can well imagine, the same level of individual threat is contained in all torpedoes and cruise missiles from the point of view of the ship that is being shot at, regardless of whether it is fired by a superpower or a Third World country. Tomorrow's Navy must be able to prevail against all threats. The submarines, ships, and aircraft we are developing and building must be able to defend themselves against the threat individually, as a battle group or as part of a joint operation.

The Trident II Fleet Ballistic Missile (FBM) system became operational in 1990. We now have two Trident II capable submarines deployed with a third undergoing shakedown operations. By the end of this decade, the *Ohio* class submarine will be the only FBM class of submarines in service. Due to affordability issues, the *Ohio* class submarine construction program has been capped at 18. The modernization of the first eight of the class from the Trident I (C-4) missile system to a Trident II (D-5) capability has been deferred outside the FYDP. Current plans call for the Pacific Fleet to be C-4 capable with 8 submarines and the Atlantic Fleet to be D-5 capable with 10 submarines. With Trident I submarines having missiles whose age will exceed 20 years prior to retirement, close attention must be paid to maintenance of the Trident I (C-4) system. Continued investment to sustain the viability of this Nation's most invulnerable deterrent is essential to ensure its credibility well into the next century.

The Trident II Fleet Ballistic Missile System provides a flexibility and capability far surpassing the capabilities of any previous sea-based nuclear deterrent system. Its flexibility to carry various kinds of payloads will permit the deployment of the new missile system during the period of interrupted warhead production by the Department of Energy at Rocky Flats. Efforts are also underway to identify alterna-

tive methods of preserving the enhanced capabilities of the missile should this interruption continue.

Continued production of the SSN-21 class *Seawolf* submarine remains critical to maintenance of our undersea superiority into the next century. The SSN-21 represents a quantum leap in quieting, sensors, and firepower over the Improved 688 class submarines. This leap will restore the margin of individual superiority traditionally enjoyed by U.S. Navy submarines, a margin that has eroded over time due to continuing improvements in Soviet and other submarines. We must continue production of *Seawolf* to ensure that we can meet the evolving submarine threat.

The number of U.S. Navy submarines to be procured has been cut significantly in the last year, presenting us with the difficult task of preserving industrial base at building rates far below the historical average. SSN 688I procurement concluded with the fiscal year 1990 ship, while the Trident program ends with the fiscal year 1991 ship. With only a single SSN-21 planned in each year through 1995, we are clearly in a situation where both submarine shipbuilders will need to downsize regardless of near term procurement decisions on SSN-21.

As you know, the contract for the fiscal year 1991 *Seawolf* was awarded to the Electric Boat Division of General Dynamics on May 3, 1991. Newport News Shipbuilding and Dry Dock subsequently filed suit seeking to overturn this award. Pursuant to an order from the United States District Court for the Eastern District of Virginia, execution of the fiscal year 1991 *Seawolf* contract has been held in abeyance pending resolution of the Newport News Shipbuilding suit. As this matter is currently in litigation, further discussion in this forum of the issues raised by Newport News Shipbuilding would be inappropriate.

In an effort to seek a more affordable complement to the *Seawolf*, the Navy has begun the "Centurion" study to define a new class of attack submarine. Much like *Seawolf*, this submarine would carry the attack submarine force into the multi-mission environment of the next century, entering service around the time that the first 688 class submarines reach the end of their service life. A requirements review to define desired missions and characteristics for the new attack submarine is currently in progress. This review is in its final stages now, and I anticipate receiving the results shortly. A major goal is to reduce the cost in the post-*Seawolf* era to more than one submarine could be funded each year.

The joint Navy-DARPA Advanced Submarine Technology program and related sensor efforts included in the Unmanned Autonomous Underwater Vehicle program are providing vital input to the design considerations of this next class of attack submarine. We are considering a wide range of design characteristics to insure it is both affordable and capable. The emphasis of these programs is on stealth materials, new technologies and affordability. Technologies from this program are currently being incorporated into the *Seawolf*, the R&D submarine USS *Memphis* (SSN-691) and are expected to provide technological innovations to the new submarine.

The Navy and Marine Corps rely upon science and technology to supply innovative solutions to today's warfighting requirements and to prevent technological surprise in the future. Technological superiority assumes greater importance as we downsize to a more affordable fleet. With a leaner fleet, the need for the most efficient systems that we can field is imperative. The warfighting edge we enjoy today is a result of continuing investments in science and technology performed in universities, Navy laboratories and industry. The Navy envisages to cultivate the technologies that will serve as a source of new systems concepts as future needs arise. This basic research is vital to maintaining our edge in submarine and ASW technologies.

Our investment in ASW capability has focused in the near term on platform and sensor improvements. New passive acoustic signal processing techniques and new active acoustic systems are being developed to meet the quieting threat of new generation Soviet nuclear submarines and to deal with the very quiet and stealthy diesel submarine threat. Of equal importance, several efforts in shallow water ASW and non-acoustic ASW systems are being investigated. The Nation's ASW forces must maintain the capability to counter all potential threats, including the proliferation of Third World diesel submarines and the very real capabilities of the Soviet Union, which still maintains the world's largest submarine fleet.

The AN/BSY-1 Combat Control System for our SSN 688I Improved class submarines is now completing its operational testing and has met all expectations. The new thin line submarine towed array technology has been retrofitted to thirteen submarines, markedly improving their passive acoustic capability. Even more capable thin line towed arrays are being developed to be used on both attack and strategic submarines.

AN/BSY-2, the Combat System for the *Seawolf* submarine, continues Full Scale Development. The past year has seen the successful progression of the critical Anti-

risk reduction effort through the completion of eight Critical Item Tests. The final Critical Item Test, an end-to-end test of system response time, is in progress and should complete this fall. AN/BSY-2 remains on track to support the *Seawolf* program.

Other improvements that meet the quiet submarine threat include planned improvements to the undersea surveillance system and increased capabilities for our maritime patrol aircraft. The development of the Fixed Distributed System (FDS) is proceeding and will support deployment of an Engineering Development Model in fiscal year 1995. Fiscal pressures have necessitated a slower procurement rate for FDS production systems. We are also adapting the FDS technologies to deployable options, responsive to more temporary regional surveillance requirements. Additionally, we are looking for an operationally suitable, affordable replacement for the aging P-3C aircraft. The LAMPS MK III and carrier-borne helicopters will also be upgraded utilizing the Airborne Low Frequency Sonar (ALFS).

The Navy has been investigating the feasibility of exploiting low frequency active acoustics (LFAA) for improved detection capability against both diesel submarines and the new generation nuclear submarine threat. Testing has provided the scientific data and proof of principle that has allowed us to begin system development of LFAA adjuncts. Programs are now underway to bring this capability to the fleet. The results of testing to date have been highly encouraging.

Navy has significantly increased its level of investment in non-acoustic antisubmarine warfare. The Navy fully participated a review of non-acoustic technologies conducted by the Office of the Secretary of Defense and endorsed the plan provided to Congress in 1990. That plan called for focused efforts in four specific technology areas relevant to spaceborne, airborne, submarine-mounted and fixed-barrier ASW. Navy's program addresses all of the efforts identified in that plan.

In coordination with the Office of the Secretary of Defense, we are undertaking an aggressive effort which addresses the highest priority issues in each non-acoustic area with the goal of making informed systems decisions within the next 5 years. In fact, a helicopter-borne submarine detection system is in Advanced Development already with a P-3 capable system soon to follow. A submarine-mounted system is also in Advanced Development. Other non-acoustic developments are being investigated vigorously through extensive field tests and will enter Advanced Development as soon as appropriate.

The AN/SQY-1 (formerly the AN/SQQ-89I) ASW combat system is proceeding in its system definition and will be deployed in battle force combatants. With the increased detection range, combined with LAMPS and stand-off weapons, the AN/SQY-1 will give marked improvement to the surface combatant ASW capability and will enhance battle group survivability in a hostile submarine environment.

The T-AGOS 23 class Ocean Surveillance Ship will be the first of a new generation of SWATH (Small Waterplane Area Twin Hull) T-AGOS ships. Like the SWATH T-AGOS 19 class, T-AGOS 23 class extends the operational envelope of SURTASS into the higher sea state and consequently the higher latitude sea areas. The T-AGOS 23 design will also include greatly expanded acoustic collection capabilities with the addition of a second, active acoustic system. The lead ship was recently awarded to Tampa Shipbuilding. Four more are planned in the FYDP.

Weapons improvement rounds out our technology thrusts for ASW development. The MK-48 ADCAP program provides phased upgrades to attain needed operational performance improvements and the minimum sustaining procurement to meet our inventory requirements well into the next decade. Our lightweight torpedo requirements are driven by the potential threat's acoustic quieting and improved survivability from attack. The MK 50 program focuses on those requirements. Currently undergoing OPEVAL, we expect a MS IIIB decision on the MK 50 torpedo in August 1991.

Recent testing of the Vertical Launched ASROC demonstrated four for four successful launches resulting in about the expected acquisition and hit results from the MK 46 payload. The complementary nature of VLA to the SQS-53C and SQY-1 sonar systems has been noted. The Navy is conducting a study, due to be completed this summer, to focus its requirements and development options for a follow-on weapon. The study will address generic classes of ASW standoff weapons to re-examine the criticality of weapon operational characteristics on performance.

The Navy is also pursuing an aggressive development program in both mine countermeasures and mining. The Navy is fielding new mine countermeasure systems for two new classes of mine countermeasure ships (MCM-1 and MHC-51), and for the new MH-53E mine countermeasure helicopters. The Navy has initiated RDT&E programs for remote, shallow water and buried mine countermeasures. We are reviewing priorities in light of recent events to assure that we maintain a vital and

responsive mine countermeasure program. In the area of mine improvements, we are completing the development of the Quickstrike family of bottom mines and pursuing a shallow water ASW mine in Substrike. Additionally, an improved CAPTOR mine will increase the CAPTOR's performance against the new state-of-the-art quiet submarine target.

Over the past year the Navy's acquisition chain of command has been redefined and streamlined. The crucial need for accountability and responsibility has been addressed and has been strengthened. The past year has seen an idea that previously existed only on paper become a functioning, dynamic organization that effectively supports the needs of the Navy and the country.

The organization put in place over the past year has reduced the layers of decision reviewers and approvers. This has empowered the Program Executive Officers and Direct Reporting Program Managers with the decisionmaking authority to effectively administer their programs. The Program Executive Officers and Direct Reporting Program Managers report directly to me and have full responsibility under me for program cost, schedule and performance.

As a result of policy and organizational changes we have significantly reduced the manpower requirements within the Navy's acquisition structure. My direct staff has been reduced from 270 to 167, a reduction of 38 percent. This is independent of ongoing reductions in the acquisition program management structure. Previous to my confirmation 270 personnel were employed under the old organizations of the Assistant Secretary of the Navy for Research, Engineering and Systems and the Assistant Secretary of the Navy for Shipbuilding and Logistics, as well as in the Information Resource Management organization. We expect to achieve significant additional reductions of my staff by next fiscal year. The acquisition program management workforce is in the process of implementing a 4 percent per year cut in accordance with current legislation.

A redefined relationship with the Office of the Chief of Naval Operations, the Commandant of the Marine Corps and the Naval Systems Commands complements the internal reorganization. These revised relationships have reduced redundancy and duplication of effort between organizations, improved communications and fostered better coordination between the acquisition functions of these staffs.

The constrained fiscal environment that we find ourselves in today requires a combination of innovative strategies and time tested methods to ensure that the future defense needs of the country are met. We are embarking on a program to reduce technical and cost risk in order to ensure that our investments in the Navy of the future are wisely spent. A strategy of event-based contracting and assurance that a system is fully operationally capable prior to full rate production are essential elements of this program.

Positive control of all aspects of the acquisition process is an essential element of a coherent acquisition strategy. We are enhancing our ability to provide appropriate oversight of all programs by increasing our focus on technical and cost analysis. Cost risk is analyzed and quantified by thorough use of Cost Performance Indexes and other available data. The results are tempered with good judgment and reviewed in the context of the overall acquisition requirement. Technical risk is similarly measured, comparing progress against predefined milestone goals. Increased focus on cost and technical review is an essential element of successful acquisition management in a period of declining resources.

The ability of the program manager to make the decisions crucial to program execution without unwieldy review and approval processes is vital to the successful management of acquisition programs. Delegation of sufficient authority to Program Executive Officers and Program Managers is basic to streamlining the acquisition process. Inherent in this authority is commensurate accountability and responsibility. The focus on analysis mentioned above, combined with an increased emphasis on ethics, responsibility and accountability are core values used to ensure that timely and accurate reports are provided to my office on the status of ongoing programs. This has been accomplished through training and a clear policy on reporting requirements. Of note, the lessons learned from the A-12 cancellation have been promulgated to all levels of management within the Navy's acquisition community.

Current fiscal realities demand a thorough review of contract methodologies to ensure that contracts are awarded in the best interests of the government while being realistic and achievable for the contractor. Contracting initiatives such as dual sourcing, multi-year and fixed price contracts, while still valid, require case-by-case scrutiny in light of the reduced quantities required for a smaller fleet.

The need to support the defense infrastructure and industrial base is an important consideration in planning for the requirements of a smaller fleet. The ability to reconstitute naval forces to meet increased threats must be preserved even while

budget realities and reduced production requirements provide pressure to eliminate excess production capacity. In the near term, Soviet naval capabilities remain essentially unchanged. Erosion of our industrial base and elimination of production lines could have ominous effects in the event of a resurgence of this threat. Navy acquisition policies must take into consideration protection of the defense industrial base and of the infrastructure required to support future requirements.

Dual sourcing has been an important method of developing and maintaining competitive sources for Navy development and acquisition programs. The Navy currently has approximately 30 major and numerous other dual source programs. The development of a second source allows the Navy to take advantage of competitive market forces and may yield lower production costs. The potential for reduced production quantities requires close attention to ensure that current and anticipated dual source programs remain cost effective. Periodic reviews of all dual source programs are conducted to ensure that their continuation makes sound economic and business sense. Dual sourcing may become less advantageous in the future as the quantities required for a smaller fleet make this strategy less cost effective.

The fiscal environment of the coming decade requires that adequate flexibility be provided in contracts tailored to the type of risk involved. The need to review contract risk very carefully in terms of cost, schedule and technical feasibility is especially applicable to fixed price contracts. A realistic assessment of contractor performance and his ability to fulfill production requirements under the terms of all types of contracts must be continually monitored and appropriate action taken early to prevent occurrences of companies failing to perform.

A major initiative is underway to emphasize the use of commercial-off-the-shelf and other non-developmental items. The advantages in both cost and technology are most evident in computer hardware and software applications such as command, control and communications equipment. The ability to exploit rapid technological advances by the computer industry pays extensive advantages in time, cost and capability. The requirements for unique military functions, reliability, standardization, life-cycle logistics support and training must be taken into account along with the advantages gained by rapid introduction of state-of-the-art technology.

The new decade and the apparent end to the cold war era bring a new challenge to the Navy and the Department of Defense overall. The capitulation of cold war foes has reduced the requirement to maintain the large active fleet we now support. Operation Desert Storm has demonstrated that traditional foes are not the only credible threat in a world where technologically advanced weapon systems are available on the open market. As the size of the fleet is reduced, maintenance of a qualitative edge over potential adversaries is imperative. This requires a continued investment in procurement and modernization of ships and aircraft with a new generation of combat systems.

Operation Desert Storm has demonstrated the Navy's ability to go in harm's way and prevail. The first shot in that operation was a Tomahawk missile fired by a Navy surface ship. The critics of "high tech," precision guided munitions were silenced when the first wave of Tomahawk cruise missiles impacted their targets in Iraq. The reliability and effectiveness of the Tomahawk missile, launched from surface ships and submarines, is now part of the history of that conflict.

The land, airspace and waters around Kuwait provided a wealth of data, most of it validating the acquisition strategies of the past decade, that will be invaluable in refining the capabilities of the fleet of the future. The remarkably low level of casualties attest to the effectiveness of the ships and systems we have fielded in recent years. The exception to this might very well be mine countermeasures; an area we are continuing to evaluate. The overwhelming advantage we enjoyed over Iraq, formerly the world's fourth largest military force is an edge that underpins our entire defense strategy. If we are to maintain the ability to send our sailors and marines in harm's way, and have them prevail, as they have done proudly for over 200 years, we must give them the tools they deserve.

Over the next year the Navy will continue to institute new efficiencies in its acquisition structure in compliance with the Defense Management Review. The future of the Nation's maritime capabilities rely on today's shipbuilding programs. I will continue the initiatives made over the past year in providing proper oversight for these important investments in our Nation's defense.

Lastly, congressional support for the Navy submarine and ASW programs is well appreciated. It is clear that continued congressional support will be needed to carry on the work necessary to maintain our Navy's excellent capabilities into the next century.

Senator KENNEDY. Thank you. Admiral.

STATEMENT OF VICE ADM. JAMES D. WILLIAMS, USN, DEPUTY CHIEF OF NAVAL OPERATIONS, NAVAL WARFARE

Admiral WILLIAMS. Mr. Chairman, Senator McCain, Senator Cohen—when he returns—I am privileged to report to you the status of antisubmarine warfare.

First, I would like to offer my perspective on why ASW is important to the well being of our country. Capable ASW forces are essential in establishing and maintaining sea control, a prerequisite to power projection by our carrier-based air and Marine amphibious landings, as well as operations by the Air Force and Army.

Since 90 to 95 percent of all supplies and equipment go by sea during a war, the fight cannot be taken to the enemy without sea control. Although the Iraqis had no submarines, we must always be able to maintain ASW superiority since history shows that most crises we have been associated with have involved potential submarine opposition.

Our multi-mission ASW forces, such as Maritime Patrol, P-3, and carrier-based S-3B aircraft, were instrumental in targeting for destruction most of the Iraqi Navy. Many of our ASW destroyers and submarines shot Tomahawk missiles, a system which demonstrated a phenomenal overall success rate of about 85 percent, the single most successful weapon system in Desert Storm.

One should not forget that carrier-based air from U.S.S. *Eisenhower* and *Independence* were immediately available after Iraq invaded Kuwait and were the only sustainable forces during the first 2 weeks after the invasion that could have provided significant strikes against Saddam Hussein.

General Schwarzkopf, speaking at the Naval Academy graduation last week, credited the presence of carriers with probably deterring Iraq from invading Saudi Arabia.

Antisubmarine warfare is in an important period of transition. The dramatic course of world events and the downturn in the defense budget demand that we streamline to a smaller, more flexible force and seek more innovative ways to carry out the ASW mission.

Our efforts in this regard are well underway, but we are proceeding with some caution. The Soviets retain an extremely large submarine force and there are other smaller, but credible, submarine forces dispersed around the world.

We must remember that the submarine was the original stealth platform and remains so today in spite of dire predictions of submarine opponents a few years ago that the oceans would soon become transparent.

If anything has changed, the oceans are more opaque today. The technical quality of the submarines and submarine-launched weapons that are available today are of particular concern. Despite the positive trends in the Soviet Union, the problems in the Baltics and the extended negotiations in arms limitations cannot be discounted. The Iraq war is a demonstration of just how volatile and dangerous the rest of the world can be.

Given the changes in the Soviet Union and the current absence of another regional menace like Saddam Hussein, the need for a strong ASW force has been questioned in some quarters. Although

ASW must be balanced with a number of competing requirements, it remains a national issue of strategic importance.

Our country is economically dependent on sea-based commerce and freedom of the seas is paramount to that traffic.

A major portion of the strategic strike capability poised against us, as well as the most vital and survivable portion of our own strategic capability, is based in submarines.

The requirement for secure and rapid sealift is critical to the success of major joint operations overseas. The long leg in any possible Soviet retrenchment would be a large, modern submarine force, and that force is already in place.

As stated earlier, sea control is paramount for power projection against any adversary. Dominance over, on, and under the sea in the conflict area is a basic requirement. As more countries strive to acquire a submarine force, this capability is important. Clear ASW superiority will deter Third World countries who consider plans to challenge us with submarines. For this reason, ASW remains a top Navy priority.

Our future strategy and force mix better reflects the President's objective of more focus on regional power projection. We have taken the major portion of Navy force reductions allotted to ASW from our blue water area ASW forces. These are forces used previously for countering the Soviets, such as SURTASS, Maritime Patrol Air, SSNs, and the Fixed Distributed Surveillance System.

We have also stood down our *Knox* class frigates planned for convoy escort duty to a 6 month standby status.

We have protected most of our task force and other ASW systems used primarily to establish local sea control. ASW objectives for the 1990s are to retain a capability to counter the Soviets but increase our emphasis on regional ASW against other submarine forces.

Examples of ASW systems which we plan to continue to emphasize include the SSN-21, SURTASS Low Frequency Active, ASW helos and dipping sonar, and improved hull-mounted sonars, such as the SQS-53C for surface ships, which, by the way, I had the opportunity to operate with in the Sixth Fleet.

ASW is a force intensive warfare area. As we continue to downsize, we are moving to increase our ASW communications capabilities and computer-aided decision aids to help us extract the most from our remaining ASW platforms.

Combined arms, which is really teamwork between all available ASW platforms, is the best approach to ASW.

The most important factor in maintaining a capable ASW force is realistic training of the highest quality people, which we currently have in the Navy, and which, in fact, is the highest quality we have ever had in the history of the Navy. This was also a key factor in why we did so well in Desert Storm—realistic training of quality people.

In summary, the changes I have described best capture the new direction we are taking in ASW. ASW is a unique Navy mission and remains a central component of maritime superiority. We have refocused our objectives and tailored our forces during the process of overall Navy reductions.

With your continued support, we will continue to put to sea the most capable ASW force in the world.

Gentlemen, that completes my opening remarks. I think Admiral Jones, with Mr. Cann's permission, will be next.

[The prepared statement of Admiral Williams follows:]

PREPARED STATEMENT BY VICE ADM. J.D. WILLIAMS, U.S. NAVY, ASSISTANT CHIEF OF NAVAL OPERATIONS (NAVAL WARFARE)

INTRODUCTION

Mr. Chairman and distinguished members of the committee, I am privileged to report to you the status of Antisubmarine Warfare.

Antisubmarine Warfare (ASW) is in an important period of transition. The dramatic course of world events and the downturn in the Defense budget demand that we streamline to a smaller, more flexible force and seek more innovative ways to carry out the ASW mission. Our efforts in this regard are well underway but we are proceeding with some caution. The Soviets retain an extremely large submarine force and there are other smaller but credible submarine forces dispersed around the world. Despite the positive trends in the Soviet Union, the problems in the Baltics and the continuing difficulties in arms limitations cannot be discounted. The Iraq war is a demonstration of just how volatile and dangerous the rest of the world can be.

Given the changes in the Soviet Union and the current absence of another regional menace like Saddam Hussein, the need for a strong ASW force has been questioned in some quarters. Although ASW must be balanced with a number of competing requirements, it remains a national issue of strategic importance:

a. Our country is economically dependent on sea-based commerce and freedom of the seas is paramount to that traffic.

b. A major portion of the strategic strike capability poised against us, as well as a major portion of our own strategic capability, is based in submarines.

c. The requirement for secure and rapid sealift is critical to the success of major joint operations overseas.

The long leg in any possible Soviet retrenchment would be the large, modern submarine force and that force is already in place. Submarines are the predominant platforms which can deny and challenge freedom of the seas. For this reason ASW remains a top Navy priority. As more countries strive to acquire a submarine force, this is especially important. Clear ASW superiority will deter Third World countries who consider plans to challenge us with submarines. We have refocused our objectives and of necessity revised our investment plans but ASW is a unique Navy mission and a strong ASW force remains a central component of our maritime superiority.

This rapidly changing and still uncertain security environment has had major planning implications for every warfare area but this is especially true in ASW. Just 3 years ago our effort to counter the rapidly growing Soviet submarine threat was our top priority. The Soviet Union remained a self proclaimed adversary and was investing in a submarine building and modernization program of record proportions. Then abruptly the Berlin Wall came down and Soviet withdrawals in Central Europe greatly reduced the near term risk of global war. The assessment of the overall Soviet threat, coupled with subsequent budgetary pressures, has resulted in a major descoping in our ASW investment strategy.

Following the positive developments in the Soviet Union, the President in March 1990 spelled out a revised national security strategy better suited to the emerging New World Order. He called for increased emphasis in our ability to project power on a regional basis. In a speech in Aspen, Colorado on August 2, 1990, President Bush further modified the strategy by calling for smaller forces capable of responding swiftly and effectively to regional crises but at the same time warning that we must guard against a major reversal in Soviet intentions by maintaining the potential to "reconstitute" the current size and capabilities of our Armed Forces.

The revised national strategy, when coupled with continuing trends in global submarine capabilities, presents some dilemmas in ASW planning. The Soviet Union has been downsizing its military forces but, in contrast to this overall trend, the Soviet submarine force has been largely exempt. Older, obsolete submarines have been laid up or scrapped but modernization and new construction continues. At the same time, there is a steadily evolving submarine capability among the countries of the rest of the world. The modern diesel submarine makes a powerful addition to

the sea denial capability of a small navy. Such a capability must be effectively countered if we are to support the future regional power projection/crisis response capabilities the President has called for.

The results of even a modest submarine capability were tragically illustrated in the early stages of World War II. The Allies suffered enormous losses at the hands of a small German submarine force whose capabilities they had largely underestimated. The leverage of even smaller numbers of submarines was more recently illustrated in the Falklands war. One can imagine the consequences had Argentine submarines preyed on the British logistics ships congregating at San Carlos Bay vice attempting to attack carrier groups at sea. Improving diesel submarine technology including air independent propulsion and longer range weapons will make the task even more difficult in the future.

These are the type of factors we are considering. We need to account for the large capable Soviet submarine force that is continuing to be improved regardless of estimates of current Soviet intentions. We also must keep our eye on the modern diesel submarine capability of the Third World. We have revised our ASW objectives to better reflect these requirements and at the same time remain within the budget constraints we will continue to face.

ASW OBJECTIVES FOR THE 1990s

In the 1980s our efforts were almost entirely focused on the Soviets and the need to support the massive resupply efforts that would be required to support a defensive war in Central Europe. Although we must retain the means to achieve these objectives, we need to increase our efforts to support power projection/crisis response on a regional scale.

Strategic deterrence is the foremost element of U.S. military strategy. A large portion of the Soviet's strategic striking power is based at sea. Land-based and air-delivered strategic weapons can be countered in other ways, a robust ASW capability is the only means to provide deterrence against submarine-launched ballistic missiles. Therefore, our first objective continues to be the ability to hold Soviet Strategic submarines at risk.

Our second ASW objective is the ability to establish ASW sea control for power projection forces. Future crises will most likely require the timely introduction of forces into areas where the United States does not maintain a significant presence. The majority of predicted future flash points are likely to be in littoral areas and the bulk of U.S. forces and their heavy equipment will move by sea. The Gulf war demonstrated the importance of sea control as a precursor to power projection. Every SL-7 fast sealift ship arriving in the Gulf was the equivalent of 115 C-5 logistics aircraft. Our forces were supported by uninterrupted lines of supply by sea and our success in the conflict was a direct result. The lack of a present day submarine threat in the Gulf could easily cause one to overlook the impact that an opposing submarine force could have on future regional conflicts.

Our third objective is to monitor the level (quantity/quality) of Soviet submarine activity. The Soviet submarine production capability remains intact and their building rate of nuclear and diesel submarines continues to be substantial. The Soviets have retained a modern submarine force regardless of present perceived intentions. Soviet submarine progress and operational activity must be monitored to avoid technical surprise.

Finally we must retain the capability to counter potential Soviet open ocean submarine capability. A major portion of remaining Soviet military power is concentrated in its submarine force. Although our national strategy has taken a more regional focus, prudence demands we maintain sufficient ASW capability to counter a force which retains the potential for such global reach. Bridging each of these four objectives we must have an assured ASW command, control, communications, and intelligence (C^3I) capability. C^3I is becoming increasingly important to all Navy missions, but nowhere more important than in support of our ASW objectives. Future ASW will not only be more technologically demanding, but much more force intensive. A robust C^3I allows us to squeeze the last ounce of capability out of our remaining force structure.

SOVIET SUBMARINE CAPABILITIES

The Soviets operate the world's largest submarine fleet. Although overall Soviet submarine force levels are projected to decrease over the next 20 years, their submarine fleet is becoming quieter and more powerfully armed with new ballistic and cruise missiles.

Past Soviet submarine designs have emphasized speed, diving depth, and hull strength. In recent years, however, the major trend in Soviet submarine capability has been in the development of quieter, more streamlined hulls. Although we were able to compensate for these trends through the 1980s, it is increasingly difficult to maintain our margin of superiority. The reduction in self-noise has had a second benefit for them as it improves the performance of their acoustic sensors.

Additionally, Soviet submarine survivability has steadily evolved from a design and construction standpoint. New hull materials and construction designs have made Soviet submarines more resistant to hull rupture.

The armament aboard the more stealthy Soviet submarines has kept pace. The extended range of submarine-launched cruise missiles has forced a corresponding expansion of U.S. ASW battle space around sea control and power projection forces.

The Soviets have been decommissioning obsolete submarines, primarily post-World War II diesels and first generation nuclear submarines. At the same time, they are continuing to build more quiet, sophisticated submarines of the Victor III, Akula, and Kilo classes. The overall numbers will be reduced but they are steadily introducing modern submarines into their force at building rates about three times that of the United States. The result produces a significant increase in the quality of the Soviet submarine force for the 1990s and well into the next century.

THIRD WORLD SUBMARINE POTENTIAL

Although Third World submarines don't pose a threat to our overall national security, they do represent a significant capability to delay our power projection in regional conflicts. Unprotected commercial and military resupply shipping in the region of conflict are vulnerable to torpedo, mine, and missile attack.

Since 1970, the number of non-aligned countries possessing submarines has doubled and overall submarine inventories have grown significantly. Additionally, the quality of Third World submarines has improved as their older second hand units are replaced by new production and modernized submarines both domestically produced or imported.

The increase in the technical quality of the submarines and submarine-launched weapons that are available to the Third World are of particular concern. The Soviet Union builds an export version of its latest, most modern diesel-electric attack submarine, the Kilo. West Germany has delivered over 20 type 209 diesel attack submarines to Third world countries abound the world—in South America and Southeast Asia. Most of these submarines were built within the past 15 years. Submarines can be equipped to fire submerged-launched anti-ship missiles and wake homing torpedoes which are available on the world market. Even less capable submarines can still pose a significant threat to commercial shipping, military logistic ships, and naval task forces with these covert "cheap kill" weapons.

The Peoples' Republic of China accounts for a significant portion of the 20 year growth, but other nations, notably North Korea and India, have substantially increased their submarine fleets in just 10 years. India in fact has been the primary recipient of export Kilos provided by the Soviet Union and for a time had leased a nuclear, cruise missile firing submarine.

It is unlikely that any Third World nation will build a submarine force capable of extended campaigns at great distances from their homeland. However, there are Third World submarine forces which can pose a significant threat to commercial shipping, military logistic ships, and naval task forces which attempt operations in the home waters of those nations.

FUTURE ASW DIRECTIONS

The fundamental nature of ASW will remain the same for the foreseeable future. The submarine's inherent stealth drives ASW by continuing to place severe limits on detection. ASW tactics and doctrine of the 1980s have remained valid. The changes are in the technical escalation associated with continuing improvements in submarine mobility, stealth and standoff weapons capability.

Detection is a function of two factors: sensor performance and numbers of platforms. Increasing the number of platforms can offset limited sensor performance; however, improved sensors are always the most attractive alternative due to affordability. There are some promising improvements on the horizon, but there are still no panaceas and submarines will continue forcing the commitment of relatively large force levels. Therefore, we will continue to need a balanced force with the most improved sensors and weapons we can provide.

As for doctrine, we continue to deal with the submarine in much the same way land forces deal with guerrillas. Attrite the enemy forward as close to his havens

and bastions as possible. Keep pressure on with offensive area operations to the maximum practical extent and provide strong local defenses against ambush by those which might slip through the forward forces.

We are pressing forward with the technical improvements needed to support our revised objectives. The following are some of the highlights of our future ASW planning.

First and foremost, we must continue to attack the detection problem. Quieting trends in Soviet nuclear submarines and modern diesels are still progressing rapidly. Quieting, not force levels, is our hardest ASW driver. Sensor improvements which keep pace and can be back fitted into existing platforms must and are being aggressively pursued.

We must continue to build survivable, front line SSNs. The SSN is best suited for our forward area ASW operations and is the only platform capable of conducting sustained operations in these areas. As Soviet submarines continue to improve, the long term success of these missions rests in a clearly superior SSN such as the SSN-21.

Large area acoustic surveillance, both active and passive, continues to be the best method of countering an open ocean threat. The speed and endurance of a maritime patrol aircraft still makes it the most cost effective way to localize and prosecute cues from our surveillance system. Quieting trends once jeopardized the effectiveness of both of these systems; however, a number of sensor improvements are under development and impressive progress was made in the late 1980s. Although these plans have been slowed with recent budget adjustments, we are making every effort to sustain the momentum.

Increased emphasis on regional power projection dictates that we continue to emphasize improvements in task force ASW defenses. The SQS-53C mid-frequency active sonar in our surface ships and the SH-60F dipping helicopter are especially promising. Active sonar improvements for both air and surface platforms are being developed. These improvements will provide the type of increased search rate that will be needed as overall force levels come down.

We are also expanding our efforts in coastal and shallow water ASW. Confronting small diesel submarines in the extremely complex environment of littoral waters is a tough problem. Our efforts include investigations of non-acoustic sensors which could be used against depth-constrained submarines in areas where traditional acoustic sensors may not be effective. At the same time, we must ensure that our weapons have a full range of capabilities for the expanded matrix of targets and environments.

More emphasis is being placed on developing better defensive/reactive capabilities for platforms. We must not allow opposing submarines the opportunity for cheap kills. Improved submarine and surface ship defense against torpedoes through the use of countermeasures, decoys, jammers, and counterweapon weapons have extremely high leverage. A robust periscope detection capability is also a priority.

To reiterate, no single platform or sensor emerges as an all purpose ASW solution. The mix of targets and environments is simply too complex. A combined arms doctrine emphasizing the special strengths of each platform and sensor is still our best approach. We are continually seeking new innovative force packaging options to more effectively fit our needs.

Continuing emphasis on training is central to all our efforts. Plans are in place for improving platform embedded system trainers as well as shore based trainers. Training in shallow water environments associated with regional conflicts is now a major near-term goal and, in this regard, we will continue to emphasize training with our allies to maximize our interoperability and compensate for our reduced force levels.

As we continue to press forward in these areas we are keenly aware that our forces must be reduced and our plans must be tempered by affordability. In this environment the outstanding multi-mission capabilities of our platforms will help us to retain a balanced capability in ASW and across other warfare areas. For example, primary ASW platforms such as P-3 and S-3 aircraft, SH-60 helicopters, attack submarines and ASW destroyers all made major contri tions during Desert Shield/Desert Storm including surface surveillance and land strike.

We also continue to take other cost saving initiatives. As an example we are standing down 32 of our *Knox* class frigates on a 6 month standby for recall to convoy duties if needed. Reservist manning/training continues to be top priority of all warfare areas.

CONCLUSIONS

While ASW must be balanced with a number of competing requirements, it remains a national issue of strategic importance and a unique Navy mission:

— As the world's foremost maritime nation, we remain economically and strategically dependent on the sea.

— The submarine is the one threat that can endanger our use of the seas.

— We must continue to monitor/counter the residual Soviet undersea threat.

— We must also move in new directions to counter emerging technology and growing capabilities of regional powers for shallow water littoral warfare.

Lastly, I thank you for the opportunity to testify on behalf of Antisubmarine Warfare today. Continued congressional support for this warfare area, vital to our national strategy, is greatly appreciated.

Senator KENNEDY. Thank you. Admiral Jones.

STATEMENT OF REAR ADM. RAYMOND G. JONES, USN, DEPUTY ASSISTANT CHIEF OF NAVAL OPERATIONS, UNDERSEA WARFARE

Admiral JONES. Mr. Chairman and distinguished members of the subcommittee, I welcome the opportunity today to report to you on the submarine force.

My past years of operational experience with the submarine force forms the basis of a few key points that I would like to make.

First, it is clear that the SSN-21 class attack submarine is needed in the fleet as soon as we can get it to sea. *Seawolf* is the key, the blue chip, to maintain our undersea superiority over potential adversaries.

The margin of capability that we have enjoyed in the past has been significantly reduced by the quantity and quality of modern, quiet submarines being built by the Soviet Union. The Soviets have the world's largest submarine force, and they continue to modernize. Ten submarines were completed in 1990 alone. New Soviet submarine construction has continued unabated, and we expect new, more capable classes to be introduced in this decade.

Senator KENNEDY. Admiral, just on those submarines, how many of those are diesel submarines and how many are for export? I have been listening to how they are being produced, and I think we have to be honest about how many are being produced for export and international sale, and how many are diesel submarines.

Admiral JONES. Senator, 4 diesel boats were out of those 10.

Senator KENNEDY. How many of those are going to be in the Navy, and how many are going to be sold overseas?

Admiral JONES. Admiral, I will have to get that for you—Senator, excuse me.

Senator KENNEDY. I am a commander on my little boat at the Cape, but that is as far as I can get. But thank you. [Laughter.]

Admiral JONES. They produced four Kilos, sir, and one of those was for export.

Senator KENNEDY. How about of the ones that are being produced this year? You can come back on that if you want to. It's just that this is the second time we have heard what was being produced this year, and what was produced last year. I understand that a percentage of those were diesel and a percentage of those were for sale internationally. I think it is only fair, when talking about what the Russians are producing, not to suggest that they are all going into the Soviet Navy. When the United States is pro-

ducing them, all of ours are going into the U.S. Navy. But for the Soviets, they are not.

I think any fair representation, at least as far as I am concerned, in terms of credibility, ought to point these matters out.

Admiral JONES. Yes, sir.

Senator COHEN. Six out of the 10 are nuclear, right?

Admiral JONES. That's correct, sir, and one Kilo class diesel boat was for export.

Senator COHEN. They have four diesels.

Admiral JONES. They produced four diesels. Yes, sir.

Senator COHEN. One of those is for export.

Admiral JONES. That's correct, sir.

Senator KENNEDY. Is this for 1991 or 1990, now.

Admiral JONES. That was for 1990.

Senator KENNEDY. How many submarines for 1990?

Admiral JONES. There were 10, sir.

Senator KENNEDY. Okay. How many diesels?

Admiral JONES. Four.

Senator KENNEDY. How many for export?

Admiral JONES. One of those.

Senator KENNEDY. For 1991?

Admiral JONES. We estimate that there will be eight submarines, sir.

Senator KENNEDY. How many diesels?

Admiral JONES. We believe there will be, again, four diesels.

Senator KENNEDY. Do you know whether they are going to be involved in sales?

Admiral JONES. I do not know whether any of those will be for export.

Senator KENNEDY. You see, in the testimony of Admiral Williams, he talks about India purchasing the Soviet export submarines. I am just trying to put these matters into some kind of perspective, such as how many the Indians are buying, and how many diesel submarines are being produced by the Soviet Union. Now we find that the Soviet Union is producing diesels, and we are trying to find out whether they are for sale and whether they are going to Third World countries, so that we have a complete picture on this.

Admiral JONES. Yes, sir. I think, recent history will show about 25 percent, or one a year, are for export, sir.

Senator COHEN. Let me say that the Chairman raises a very valid point in terms of what their capability is going to be. There is another facet to this, however, and that is by maintaining a capacity to produce 10 of these ships a year, they do have an industrial base, which gives them quite a leg up on the United States. As we are shrinking down, we may end up with only one yard producing nuclear submarines in this country.

I am not sure what that means in terms of the industrial base and what it is going to mean in terms of being able to produce only one ship a year as far as maintaining the personnel. I think that is another side of it.

Senator KENNEDY. I think that is very legitimate. We may be getting ahead here, because if we have made a judgment that we are only producing one, what are we doing in terms of challenging the Soviet Union in terms of their production of attack subma-

rines? Are we trying to make any progress? It gets back to questions of arms control at sea that some of us have been concerned about. We will have to get into that at another time.

We have made a decision to produce the *Seawolf*. We are going to do that at one a year on into the future, barring other kinds of escalation. We are doing that. We have made the judgment to do that. We have made it virtually, as I understand it, unilateral.

I, for one, think that we ought to be getting something for it from the Soviets if we are challenging them on it.

We will come back to the strategic questions. If you could, provide for us, going back to the 1989–1990–1991 timeframe for the record, how many submarines were produced, how many were for exports, and so on. We would appreciate it.

Thank you.

Admiral JONES. Yes, sir. I would be glad to do that.

[The information follows:]

Soviet submarine production for the period 1989–1991, including submarines produced for export, is as follows:

	1989	1990	1991 (estimated)
Nuclear	5	6	[Deleted]
Diesel	4	4	[Deleted]
Total Production	9	10	[Deleted]
Number of diesels for export	1	1	[Deleted]

Admiral JONES. Senator, the *Seawolf* will be many times quieter than our Improved 688, have improved combat systems, carry almost 40 percent more firepower, be deeper diving, more survivable, and have significant margin for growth and improvements in the future.

Seawolf will maintain this Nation's undersea superiority by regaining the margin we have lost and carry our submarine force into the 21st century with a significant technological advantage.

My second point, Mr. Chairman, is that the role of our attack submarines, in a most uncertain world, is growing, not diminishing. For example, 13 submarines operated in support of Operation Desert Shield/Desert Storm, and some fired land attack Tomahawk missiles against targets in Iraq. In addition, attack submarines conducted surveillance operations and provided valuable, real-time tactical intelligence for battle group commanders while supporting the United Nations embargo against Iraq.

Submarines have unique multi-mission capabilities that apply across a broad spectrum of possible conflict, and I believe that two principal advantages of nuclear powered submarines—stealth and endurance—will be called upon frequently in regional crises which could potentially erupt in the years ahead.

My third point is that we must maintain a sufficient force of attack submarines in order to provide our Nation with this unique capability in the 21st century. Such a force cannot be sustained in the long-term by building only one *Seawolf* submarine a year.

When *Los Angeles* class attack submarines begin to retire in the next decade, we will be losing three ships a year and gaining only

one. Ultimately, this will leave our Nation with a force of only 30 attack submarines by the year 2025.

To help this situation, the Chief of Naval Operations directed that we define options for a new, more affordable, attack submarine.

We are currently 3 months into this process, with committees of personnel experienced in submarine operations and design evaluating key characteristics such as quieting, speed, depth, endurance, combat systems, weapons and launchers, connectivity and special features.

Once this phase of the characteristics study is completed, OP-02 will evaluate ship parameters and align on-going generic research and development efforts.

Research and development work in critical areas, such as nuclear propulsion, is already providing vital input in the development of these characteristics.

My fourth point is that our submarine nuclear deterrent force is also growing in importance. With deployment earlier this year of the new Trident II or D-5 missile system in our Atlantic fleet SSBNs, these ships now carry for the first time, the most advanced and accurate ballistic missile in our Nation's arsenal.

Combined with our survivability and connectivity, this system truly anchors the strategic triad. This most formidable weapon will deter any potential adversary from engaging in nuclear aggression well into the 21st century.

Although the backfit of C-4 missile capable Trident submarines to D-5 capability has been delayed due to fiscal constraints, this process must continue as a critical element of our Nation's strategic force modernization program.

My final point, and the most important, is about people. Our superiority in underseas warfare today and in the future hinges on the superb performance of the bright, dedicated young men and women who man and support our submarines and our worldwide undersea surveillance systems.

The submarine force has always been a relatively small part of the Navy. Only about 7 percent of Navy personnel are submariners, but this small group mans one-third of all Navy combatant ships.

We have some of the best people in the Navy manning these high tech submarines. Today, about 20 strategic ballistic missile submarine crews are on patrol maintaining a credible, survivable deterrent posture, and 36 attack submarine crews are at sea worldwide.

In the future, with increasing complexity in modern submarine warfare, the demand for quality personnel will be even more critical. Only through your continued support will we be able to recruit and retain this most valuable resource—our talented and dedicated submariners.

In conclusion, I would like to thank the members of this committee for your support for submarine programs in the past. I would ask again for your support of the programs in the President's budget.

Mr. Chairman, I would like to submit a more detailed statement for the record, and I am ready to respond to the committee's questions.

[The prepared statement of Admiral Jones follows:]

PREPARED STATEMENT BY REAR ADM. RAYMOND G. JONES, JR., U.S. NAVY, DEPUTY ASSISTANT CHIEF OF NAVAL OPERATIONS (UNDERSEA WARFARE)

INTRODUCTION

Mr. Chairman and distinguished members of the committee, I am privileged to report to you the status of the submarine force and to outline the submarine programs in the President's budget today.

In order to place in perspective the direction of the submarine force as we enter the uncertain decade ahead, I will discuss our views of the following key points:

First, the end of the cold war has brought more instability than peace. Emerging worldwide economic and political realignments, national unrest, and the continued proliferation of high technology weapons to unstable nations make this one of the most uncertain periods in modern history. In the face of this uncertainty, our strategic ballistic missile submarines provide a stabilizing nuclear strategic deterrent. Our strategic ballistic missile submarines provide the most survivable and enduring weapon system which can hold at risk the entire Soviet target spectrum. In addition, our attack submarines play an important deterrent role by holding Soviet sea-based targets at risk. They also provide an economical, versatile instrument for maintaining freedom of the seas and providing unique covert multi-mission capability in support of national objectives.

Second, despite budget pressures and perceptions of a reduced threat, the United States cannot afford to relinquish its maritime superiority. This superiority was born of necessity from the geographic realities of our Nation and has ensured the free flow of commerce necessary to maintain our Nation's economic stability and growth. Sea control is also vital to shield our shores from any potential aggressor. Additionally, it provides a bridge for power projection in responding to regional crises around the world. Since antisubmarine warfare (ASW) and anti-surface warfare (ASUW) capabilities are required for effective sea control, and a fundamental element of these capabilities is the attack submarine, we must maintain a modern and capable attack submarine force.

Third, the capability of the nuclear attack submarine force of the 21st century and the industrial capacity of our Nation to develop and construct nuclear submarines will be determined by decisions we make today. While present submarine classes give us the edge in overall undersea supremacy and can provide effective multi-mission support, only *Seawolf* class attack submarines can guarantee our undersea superiority into the 21st century. We must build the *Seawolf* because we must maintain the technological edge over the most capable projected threat—and build at a rate which will preserve our critical nuclear ship-building industrial base. We must build to counter capability, not intentions.

Fourth, with the shift toward a multi-polar world, the submarine force has made appropriate realignments in its force structure and priorities consistent with the CNO's posture statement. In the face of growing fiscal constraints, and in keeping with our commitment to provide a cost-effective, flexible submarine force, we are reducing our force structure while concomitantly pursuing improved capability through an integrated and aggressive advanced submarine technology research and development effort. The result will be a smaller, more capable force better able to perform the wide variety of missions envisioned for the future.

Finally, the most important factor in the continued success of the submarine force, as well as the Navy, is its people and their state of training. The value of the intelligent, carefully selected, and highly trained all volunteer submarine force professional cannot be overemphasized. Despite advances in technology, it will always be the All-American Blue Jacket's exceptional ability to operate and fight the submarine which will determine the outcome of any undersea warfare encounter.

ROLE OF THE SUBMARINE FORCE IN A DYNAMIC WORLD

With the dramatic changes we have witnessed in the last 18 months, it is understandable that the required capability and role of our submarine force in the 21st century have been widely discussed. The fall of the Berlin Wall and changes in Eastern Europe indicate to many that the world has entered an era of greater cooperation and global stability. However, it has now become clear that conflict is more

likely to flare into crisis. In many countries, aggressive modernization of military and naval forces, especially submarine forces, is continuing. *Considering these factors, we believe that CAUTION is the watchword of the world today.* We cannot afford to back away from the support which has produced the world's leading submarine force with its ability to fulfill a multitude of critical roles in support of our national defense. These roles can be summarized in three primary objectives:

- First, our strategic submarine force must continue to provide a credible sea-based strategic deterrent. This has served us well for the last 30 years because of continuing modernization and will continue to provide the needed deterrent to counter the uncertainty which lies ahead.
- Second, our attack submarine force must provide its flexible, covert multi-mission capability across a broadening spectrum of conflict.
- Finally, our attack submarine force must maintain its capability to contribute to sea control.

These objectives must be fulfilled with maximum efficiency as we carefully scrutinize our programs to ensure that our Nation is getting the most capability for every dollar invested.

Our strategic submarine force continues to set the standard for strategic missile delivery systems capability and cost-effectiveness. Our 22 Poseidon and 11 Trident submarines deploy nearly half of our Nation's strategic warheads for less than 25 percent of the Department of Defense's strategic budget. The entire strategic submarine program consumes less than 10 percent of the Navy's budget.

Our attack submarine force is similarly well suited to provide its unique covert capability in regional conflicts. During the past months, 13 attack submarines participated in Desert Shield/Storm-related activities. Attack submarine operations included indication and warning, surveillance, battle group support, strike warfare, and contingencies for mining and special warfare. These operations proved the multi-mission capabilities of our attack submarines and their ability to affect events at sea and on land.

In addition, the stealth and staying power of a nuclear powered attack submarine allow it to perform these missions in militarily denied areas, unsupported by foreign bases. Attack submarines are also capable of rapid response and can be quickly vectored to a crisis area, unencumbered by underway replenishment or weather and without regard to enemy air, sea, or land control in the crisis region. In Desert Storm, for example, the U.S.S. *Louisville* transited at an average speed of well over 20 knots for 12,000 nautical miles to get to her firing position in the Red Sea.

The premier anti-submarine warfare capability of the attack submarine plays a vital role in establishing localized sea control which is essential for carrier battle forces to project power ashore. Sea control is an absolute necessity for maintaining our Nation's maritime superiority. This is a critical element which allows us to respond to regional crises around the world. Any nation possessing the capability to interdict our sea lines of communication or threaten our national interests from the sea, regardless of present intentions, must be deterred by superior forces.

We must sustain a Navy that can counter the most capable threat. History has repeatedly taught us that while intentions can change almost overnight—it takes years to build naval capability. The present warming of international relations may warrant a review of our near-term submarine building rate, but we must resist the urge to undermine our undersea warfare programs and fragile industrial base for short-term fiscal gains. The submarine programs in the President's budget today strike a prudent, economical balance to meet the threats of the 21st century in support of the Nation's maritime strategy.

STRATEGIC SUBMARINE FORCE

When the U.S.S. *George Washington* deployed in November 1960 with the first submarine launched ballistic missiles, our Nation began a new era of strategic stability. Throughout the next 30 years, the capability and survivability of this deterrent provided the necessary stability to weather East-West tensions which developed. Our basic philosophy of deterrence through strength has worked, and prudent force level reductions, coupled with continued modernization of our remaining force, will provide the stability required to confront the uncertainty which lies ahead.

This past year has been a period of major achievements and successes for our strategic submarine force. Trident and Poseidon ballistic missile submarines completed a total of 104 strategic deterrent patrols during the last 12 months, bringing to 2,916 the total number of patrols completed to date. In addition to this remarkable record of performance by these submarines, the Trident II(D5) missile and the Navy's strategic communications systems have all reached key modernization milestones.

Approximately one year ago, the Trident II(D5) weapon system reached Initial Operational Capability. The missile now has a consecutive string of 14 successful test flights from submerged submarines. The missile's accuracy has been demonstrated to exceed the design specification. The accuracy and the lethality of the warheads, coupled with the flexibility, reliability, and survivability of the Trident submarine system, provides credible deterrence to our Nation.

During this past year, Trident II(D5) missiles with MK-5 warheads were loaded aboard U.S.S. *Tennessee* and U.S.S. *Pennsylvania*, and these ships conducted strategic deterrent patrols in the Atlantic. Also during this past year, the newest Trident submarine, U.S.S. *West Virginia*, was commissioned. Additionally, the Navy and the Electric Boat Division of the General Dynamics Corporation agreed on a contract for construction of the 18th Trident submarine. The 18th Trident submarine was authorized by Congress last year.

There have been improvements in the connectivity to our strategic submarines. The older EC-130 Tacamo aircraft in the Pacific—our backup airborne relay link to the submarines on patrol—were replaced with the modern E-6A aircraft. These new aircraft have greatly improved the reliability, range, and survivability of this important strategic communications system. The Atlantic Tacamo squadron has also begun replacing their EC-130 aircraft with the new E-6A aircraft.

The second Extremely Low Frequency (ELF) transmitting site in Wisconsin became fully operational this year and has been synchronously linked to the other ELF site in Michigan. These two sites are providing additional robustness to our strategic connectivity systems. In September 1990, the linked ELF transmitters were tested with a Trident submarine on patrol and provided nearly total connectivity.

We have continued to test the reliability and flexibility of our strategic submarine force through the SSBN Continuity of Operations Program (SCOOP) exercises. In order to ensure the Trident and Poseidon missile submarines remain survivable during a period of world crisis, we have conducted realistic SCOOP exercises involving submarine refits and resupply at remote locations and on short notice, using Army, Air Force, Coast Guard, and civilian assistance. We have demonstrated that, in time of crisis, our strategic missile submarines can maintain nearly a 100 percent alert rate with full reliability, covertness, and survivability for an extended period of time.

Although this has been a year of achievements and successes for the Navy's strategic programs, fiscal reality has caused several revisions. The eight Trident submarines at the Bangor Submarine Base in the Pacific were originally built with the Trident I(C4) missile system. Starting in 1993, the Navy had planned to backfit the Trident II(D5) missile capability into these submarines. However, we must delay this strategic modernization program because of funding constraints.

The tight fiscal environment is also causing us to reexamine the operational concepts of our Tacamo aircraft. In recent years, we have maintained Tacamo aircraft flying continuously in both the Atlantic and Pacific areas, fully ready at all times to communicate with our missile submarines on patrol. Now, due to decreased tensions and increased warning time of conflict, and in order to save aircraft operating and maintenance costs and reduce personnel, we are placing the Tacamo aircraft on "strip alert" vice 24 hour a day flying status. This temporary posture is pending a comprehensive Office of the Secretary of Defense study of airborne resources to ensure this change in Tacamo operations will continue to provide adequate connectivity to our deployed missile submarines while saving scarce defense dollars.

The Trident II(D5) System performance continues to be excellent and missile production continues on schedule and within cost. The introduction of this key element of the strategic modernization program aboard Trident class strategic ballistic missile submarines continues on plan supporting national goals. Only the DOE Rocky Flats facility uncertainty clouds the ability to take full advantage of the performance and flexibility of this weapon system that is so crucial to the long term deterrent posture. But even that uncertainty can be worked around.

As stated by both DOD and DOE authorities, the Trident II(D5) system, including its MK-5/W-88 warhead, continues to be considered a safe weapon system. It is the sixth generation of Submarine Launched Ballistic Missile systems capitalizing on over 30 years of experience, real full scale performance data and careful evolution in design and handling. Every element of the Trident II(D5) missile, propellant formulation, and warhead design is backed by at least 15 years of experience, data, evaluation and re-evaluation.

In support of the HASC, the Drell Panel completed an excellent but, by their own evaluation, incomplete review of the Trident II(D5) missile.

It has been reported that the Trident II(D5) missiles contain a powerful propellant that can be detonated more easily than other propellants. Actual experience with

full scale Trident II(D5) and Trident I(C4) motors has shown them to survive explosive charges and impact velocities many times those possible in any rational accident scenario without detonating. When all parameters bearing on safety and handling are considered, the Trident II(D5) motors are at least as safe and, in many cases, safer than other alternatives.

The only handling concern expressed by the Panel has been eliminated with procedural changes. In their report, the Panel states "Here we note that a loading accident such as we have been describing presents a safety concern only if the Trident missiles are moved and loaded onto submarines with the warheads already mated to the missile, as is standard U.S. Navy procedure. If the warheads are mated after the missile has already been loaded into the launch tubes there is no handling worry of this type." At least until all issues are resolved, the Navy has eliminated this concern of the Panel by loading warheads aboard the missile only in the submarine tube.

The current program is supplying safe, effective missiles to the Trident submarines coming off the production line. No changes to this modern, effective, long term Submarine Launched Ballistic Missile deterrent are warranted.

Another uncertainty we face is the continuing problem caused by shutdown of the Department of Energy's Rocky Flats facility. As this facility produces some critical components for our MK-5/W-88 warheads, we will be limited in our ability to fully outfit our Trident submarine force as we had planned with the more capable MK-5/W-88 warheads. We are outfitting the first four Trident II(D5) capable submarines with Trident II(D5) missiles equipped with MK-5/W-88 warheads, but we need the Rocky Flats facility to resume operation and produce MK-5/W-88 warhead components in order for the Trident submarines and Trident II(D5) missiles to reach full capability. Until Rocky Flats reopens, we will put MK-4 warheads on the missiles of subsequent Trident submarines. The source for the MK-4 warheads will be from older Poseidon missile submarines.

In order to maintain a strong and credible nuclear deterrent force and to guard against future surprises, whether technical or political, we need the support of the Congress in several important areas.

First, we need your support to ensure that the operating and maintenance funds for the Navy's strategic submarine force are adequate. Their unsurpassed record of material and operational performance depends on the support provided by their two bases in Kings Bay and Bangor. We cannot compromise on the quality of our personnel, their training, the availability of repair parts, or the level of required maintenance. To do so would effectively destroy the most critical elements which have maintained our superb record of safety, reliability and efficiency.

Second, we need your support for a robust strategic submarine security and survivability program. This important program reviews all possible threats to our strategic submarines and develops any necessary countermeasures. In large part, because of this program, *we can state that, the Soviets do not currently threaten U.S. SSBNs in the open ocean, nor do we see indications of a future threat.* Our submarines are secure now, but our strategic submarine security and survivability program must keep pace with the rapidly changing world in order to guarantee submarine covertness and survivability well into the next century.

This is a challenging period in our Nation's history. Rapidly changing events in the world exist simultaneously with severe fiscal constraints. With your support, the Navy's strategic submarine forces can fulfill our strategic deterrent responsibilities, today and in the future.

ATTACK SUBMARINE FORCE

For the past 30 years, the sizing of the U.S. attack submarine force has been predicated on confronting the Soviet threat. We were outnumbered and, accordingly, relied upon technological superiority and training to offset our numerical inferiority. Our goal of 100 attack submarines was a fiscally constrained goal and required continued pursuit of technological leverage and tactical supremacy to enable our submarines to execute an effective wartime strategy against the Soviet Navy.

Dramatic changes have occurred in the world in the last 18 months. However, mixed signals continue to emanate from the Soviet Union. *On the one hand, the capability of the Soviet Navy, and especially their submarine force, continues to improve. They continue to upgrade their submarine force with no perceptible reduction in their construction program.* Although the number of Soviet attack submarines is diminishing, the old and operationally ineffective submarines being retired are being replaced with modern, highly capable submarines which represent a particular threat to U.S. sea lines of communication. We will remain outnumbered in the future as we have in the past. Thus, the emphasis to preserve our technological and

tactical superiority in submarine warfare will remain unchanged. As the President recently stated at the Apsen Institute, "Time and again, we have seen technology revolutionize the battlefield. The U.S. has always relied on its technological edge to offset the need to match potential adversaries' strength in numbers."

On the other hand, there is a suggestion that Soviet intentions are changing as they maintain the military capabilities to be accorded super-power status. U.S. planning emphasis is shifting from global warfare and global sea control to focus on regional scenarios which represent more likely arenas of future conflict. As such, submarine force roles and missions are changing to conform to the planning scenarios of the future. Uncertain Soviet intentions, revised priorities of submarine roles and missions and the need to maintain a reasonable hedge against future Soviet submarine improved capability have caused us to reassess our attack submarine force level goal. It is our opinion that a force level of approximately 80 attack submarines in a fiscally constrained defense posture will provide reasonable sufficiency for our Nation's defense.

In setting this lower force level, the expected roles and missions of the attack submarine in the 21st century were carefully considered. Although primarily designed to perform the most difficult ASW missions, these platforms have inherent multimission capabilities which are fully compatible with the maritime defense needs of our Nation, both now and in the future. *Attack submarines will be required to support carrier battle groups* in ASW and non-ASW roles such as strike, ASUW, and mining. In order to provide this support, attack submarines will need to contribute to local control of the seas in the immediate operating areas of these forces. Local sea control is an essential prerequisite for successful power projection operations.

Attack submarines must also continue to provide a unique covert presence for intelligence gathering and indication and warning in various areas of the world. These ships must also be available to rapidly and independently *respond to regional crises*, providing reconnaissance, special warfare and specific strike warfare capabilities prior to the arrival, but in support of, other naval forces such as the carrier battle group and the amphibious ready group. Finally, attack submarines must continue to conduct forward operations to provide real time early-warning.

An attack submarine force level of about 80 ships can be maintained until 1997, with the addition of 17 Improved *Los Angeles* class submarines now under construction, continued procurement and construction of one or two *Seawolf* class submarines per year, and the retirement of 25 older class submarines in the same period. We recognize, however, that this force level cannot be sustained in the long-term by building only one or two *Seawolf* submarines per year.

In order to rectify this situation, we have begun development of a new attack submarine which can be produced in sufficient quantities to complement our future force of *Seawolf* and Improved *Los Angeles* class submarines, and thus maintain our force levels. The new design attack submarine will take advantage of 8 years of research and development of *Seawolf* technologies today, as well as technological developments beyond *Seawolf*. The commencement of a new design effort will also help to maintain the pool of submarine design talent which has already begun to decline with the maturation of the *Seawolf* design.

It must be understood, however, that this new design attack submarine will not be a replacement for the *Seawolf*. There is no doubt that *Seawolf* is required to counter the most capable projected threat. This new attack submarine will complement *Seawolf* in the multi-mission environment of the 21st century. Since it takes over 10 years to develop a submarine, now is the time to begin the process leading to a new design.

INTEGRATED UNDERSEA SURVEILLANCE SYSTEM (IUSS) FORCE

The Integrated Undersea Surveillance System (IUSS) force currently consists of numerous Sound Surveillance System (SOSUS) arrays connected to 15 shore sites, and 18 Surveillance Towed Array Sensor Systems (SURTASS) ships.

SOSUS provides deployed submarine detection information in an accurate and timely manner 24 hours per day and 365 days per year. SOSUS is further supplemented by SURTASS ships, which operate at sea 300 days per year.

These systems provide the principal source of hostile submarine cuing data for U.S. and allied tactical ASW platforms (submarines, surface ships, and aircraft). Without this data the task of locating and tracking potentially hostile submarines would be substantially more difficult. These systems can also provide the first indication and warning of surge deployments from potentially hostile countries. In an era of tightening budgets and declining force levels, their capabilities will grow in importance.

ATTACK SUBMARINE PROGRAMS—SEAWOLF

The President's budget requests funding for the third and fourth *Seawolf* class submarines in fiscal year 1992 and fiscal year 1993, with advanced procurement for additional follow-ships. Construction of the lead ship, U.S.S. *Seawolf*, is continuing at the Electric Boat Division of the General Dynamics Corporation in Groton, Connecticut, as scheduled. Nine of ten hull sections are presently under construction with the next major key event, the landing of the reactor vessel, scheduled to occur in the next few months. The contract for the second *Seawolf* class ship (SSN-22), was also recently competitively awarded to Electric Boat.

Development and testing of *Seawolf* components continue as scheduled. Many of these components and systems were successfully tested last year, including the oxygen generator, main sea water valves, and shaft seals. The *Seawolf*'s AN/BSY-2 combat system experienced similar successes, including testing of wide aperture array hydrophone panels, display console magnetic and shock testing, and operational testing of a breadboard system data network. Additionally, a combat system Production Readiness Review confirmed that the AN/BSY-2 contractor and subcontractors are ready and capable of producing the system.

The *Seawolf* represents a truly revolutionary improvement in warfighting capability, and will guarantee our undersea superiority well into the 21st century. When the lead ship is commissioned in 1995, she will be significantly quieter than the Improved *Los Angeles* class attack submarine, carry almost 40 percent more firepower, be deeper diving, more survivable, and have significant design margin for growth. With its superior advanced AN/BSY-2 combat system, the *Seawolf* will also have the highest search speed of any submarine in the world, providing significantly greater tactical effectiveness. *Seawolf* also incorporates significant safety and habitability improvements. Improved fire resistance features, firefighting systems, shock design and flood control bulkheads will increase ship survivability.

Recent budgetary pressures, however, have caused some to question the need for the *Seawolf* program in the post-cold war era. While we agree that the present respite in intentions may have provided us a time to consider a low initial production rate (one per year), we must not lose sight of the fact that we are building the *Seawolf* for two critically important reasons: First, as stated earlier, world submarine forces are significantly improving, and all intelligence projections indicate this trend will continue. Our present classes of attack submarine cannot guarantee our undersea superiority in the 21st century. Second, with a reduced force level, it is even more imperative that the capability of each attack submarine be maximized. The *Seawolf* is the only submarine that can provide both unique, covert multi-mission capability, and control the seas against the most capable projected threat. While the reductions in the planned procurement rate have, as expected, increased the unit cost per ship, the *Seawolf* remains the most cost-effective near and mid-term option given its substantial improvement in capability over the Improved *Los Angeles* class attack submarine.

COMBAT SYSTEMS

The most important inherent characteristic of a submarine, its stealth, places an extraordinary premium on the employment of passive sensors and overall combat systems capability. Over the last 30 years, each successive combat system we have developed, from the AN/BQQ-2/MK-113 sonar/fire control system of the early 1960s to the integrated AN/BSY-2 combat system of the *Seawolf*, has incorporated major new design and performance innovations which have substantially increased the detection, tracking, and weapons launch/guidance capability of our submarines. The President's budget today requests funding for three major submarine combat systems.

The AN/BQQ-5E sonar system with the CCS MK-2 fire control system (or, the "QE2"), provides significantly improved contact management features and overall processing power, including the much needed capability to directly process input from the newly developed TB-29 thin-line towed array. This system will eventually be installed on all Trident and pre-AN/BSY-1 *Los Angeles* class submarines. Another major advantage of making the QE2 the standard of our Trident and *Los Angeles* force is that the resulting commonality will greatly reduce logistic support and maintenance costs, and thus reduce the life cycle costs of our force.

The AN/BSY-1 is the submarine force's first integrated combat system and is being installed on all Improved *Los Angeles* class attack submarines. This system incorporates a major architectural design change which has increased its processing power while integrating all primary and secondary acoustic sensors. In addition, the use of new technology significantly reduced the space and weight requirements in

the equipment spaces used by earlier systems, allowing the addition of under-ice capability to these ships. All six Improved *Los Angeles* class attack submarines now in commission have fully capable systems. Having personally embarked in the U.S.S. *San Juan* for 2 weeks, I can assure you that the AN/BSY-1 provides a solid improvement in overall capability. The AN/BSY-1 systems on all of these ships will eventually be upgraded to be able to process the TB-29 towed array, like the QE2 and AN/BSY-2 systems.

The AN/BSY-2 combat system being developed for the *Seawolf* class of attack submarines represents a significant improvement in combat systems capability beyond the AN/BSY-1. The AN/BSY-2 incorporates superior new design sensors specifically tailored to take advantage of *Seawolf*'s greatly reduced radiated noise. Coupled with its significantly increased processing and contact management capabilities, the AN/BSY-2 will achieve a level of performance an order of magnitude greater than previous systems. Although there has been much concern over the risks associated with such a large software development effort, I am confident that the specific risk reduction measures taken with this program, including the phased development of all software and extra time taken in the design definition phase, will produce a fully capable AN/BSY-2 system for the lead *Seawolf*.

WEAPONS

Today's submarine carries an impressive array of weapons which provide significant flexibility to battle force commanders over a wide mission spectrum. These weapons include the MK-48 and MK-48 ADCAP torpedoes, Harpoon anti-ship missiles, Tomahawk anti-ship and land attack cruise missiles, and MK-67 Submarine Launched Mobile Mines and MK-60 Captor mines. All of these weapons have demonstrated outstanding performance and reliability. The submarine weapons programs in the President's budget provide the improved flexible firepower required to perform the submarine missions envisioned for the future.

As demonstrated during operation Desert Storm, the Tomahawk cruise missile provides substantial capability to strike key distant targets with pinpoint accuracy. Future conflicts will also require timely, precise strikes delivered by stealthy platforms. The Block III upgrade to the Tomahawk cruise missile will enhance this capability. It incorporates the global positioning system, an improved engine, and a lightweight warhead into the missile. These improvements will provide more targeting flexibility by increasing the missile's range and the selection of targetable areas.

Future conflicts will also require a torpedo with enhanced shallow water capability. The MK-48 ADCAP torpedo improvements program, will further enhance torpedo performance by incorporating propulsion, guidance-control and software upgrades. The propulsion modifications will reduce radiated noise while guidance-control and software changes will improve counter-countermeasure, arctic and shallow water performance.

Our efforts to develop a quiet torpedo with a closed cycle advanced propulsion system, however, have been slowed by technical and engineering related problems. We are conducting a comprehensive review of the technology available to develop a quieter heavyweight torpedo. A final evaluation of the best path to pursue is expected in September 1991.

The Submarine Defensive Warfare Program will significantly improve submarine survivability by developing new defensive systems such as improved countermeasures, a countermeasures command and control unit, and a new design acoustic intercept system.

RESEARCH AND DEVELOPMENT

The submarine R&D programs in the President's budget provide the innovative technological developments which are required to maintain our technological edge. This edge must be maintained during the downsizing of our force.

Two years ago, the wisdom of Congress foresaw the need for technology enhancement in non-sensor, non-weapon areas and established the Defense Advanced Research Projects Agency (DARPA) Program. This program has been very successful and will be the keystone of future technological advances. DARPA focuses on high risk, high pay-off, advanced hull, mechanical, and electrical projects and develops advanced technology demonstration units which can then be rapidly transitioned to the Navy for further development. The Navy will continue to support these transitions.

We will also continue to support sensor and weapon R&D to provide technological leverage for the future.

The attack submarine security program examines technologies that may pose a threat to attack submarine operations in the same way that the strategic submarine security program evaluates threats to strategic submarine security and survivability.

Recent funding constraints, however, have severely limited program flexibility beyond the absolute core requirements and have significantly reduced DARPA transition projects in fiscal year 1992. Additionally, the transition of non-DARPA funded technology developments (from industry integrated R&D) have been severely limited. We must be far-sighted enough to realize that these technologies will shape and largely determine the capabilities of the attack submarine force of the future. We ask for continued support for our future requirements.

To summarize, the attack submarine programs in the President's budget provide the critical improvements in capability required to meet our objectives with a smaller attack submarine force. Recent attack submarine operations have been focused on broadening submarine roles and missions. Our research and development, sensors, weapons, and submarine construction programs are also being managed to minimized risk and maximize fiscal efficiency. With your continued support, the attack submarine force of tomorrow will have the capability required to support national objectives during the uncertain times which lie ahead.

UNDERSEA SURVEILLANCE PROGRAMS

The undersea surveillance support provided to our tactical anti-submarine warfare systems by the Sound Surveillance System (SOSUS) and Surveillance Towed Array Sensor System (SURTASS) is of vital importance. We are improving system responsiveness and communications connectivity to better provide this support. SURTASS is also providing excellent opportunities to expand cooperative ASW efforts with allied nations.

Modernization is required and planned via improvements to existing sensors and the development of new sensors to meet the challenge of the continued proliferation of quieter nuclear and diesel submarines throughout the world.

Improvements to existing sensors and systems include:

• Significant upgrade to the SURTASS array and processing equipment with initial installations beginning next year.

• Processing and automation upgrades that will reduce manpower requirements and exploit additional submarine acoustic vulnerabilities.

• Improvements and integration of the current Surveillance Direction System functions to further increase the tactical utility of undersea surveillance and reduce operator requirements.

Development and deployment of new sensors that include:

• SURTASS with a Low Frequency Active capability that will acoustically illuminate submarines and receive reflected echoes. Extensive at sea testing has been completed and the contract for the first ship, USNS *Impeccable* (SWATH A), a Small Water plane Area Twin Hull ship, was recently awarded to Tampa Shipbuilding.

• The Fixed Distributed System (FDS) concept has been tested and demonstrated capability against projected future quiet submarines. The engineering design model is in production. These systems will complement SURTASS LFA to ensure continued long term undersea surveillance capability into the next century.

• Deployable distributed systems are also under development for shorter term, and shorter notice, surveillance requirements.

We ask your continued strong support for these essential programs.

PERSONNEL

Our superiority in undersea warfare hinges on the superb performance of the bright, dedicated young men and women who man and support our submarines and our worldwide undersea surveillance systems. They accept demanding training requirements, stringent qualification standards, and arduous deployments as routine. Their extraordinary capabilities were the linchpin of the Maritime Strategy in the 1980s and their remarkable efforts contributed to the conditions which led to the end of the Cold War and the success of Desert Storm. It will be their capabilities and efforts that will sustain our edge over potential adversaries.

The submarine force has always been a small part of the Navy. Only about 7 percent of Navy personnel are submariners, however, this small group mans one third of all Navy combatant ships.

In compliance with congressionally mandated down-sizing of the Navy, we will significantly reduce undersea warfare forces and support. Over the next 6 years the

number of submarines will be reduced by 18 percent with a concomitant reduction in submarine tenders and support ships. Additionally, total Navy manning will decrease by about 14 percent and undersea manning will decrease by nearly 18 percent.

We have long managed undersea warfare manpower to keep it "lean," and will continue to do so. For example, we currently have only one officer for every 10 enlisted men, which is below Navy and DOD averages. In 1997, undersea warfare manpower will still be lean and we will maintain the same officer-to-enlisted balance. However, we must move with caution during the draw-down to ensure operational and nuclear safety are maintained. Even in a smaller submarine force, the demand for high quality personnel will continue.

Since their inception, submarines have been "high tech" and operating them has demanded quality personnel. Modern submarine warfare, like other technological warfare specialties, is undergoing rapid advances and increasing technological complexity. In the future, the demand for quality personnel will be even more critical.

• Unfavorable demographics and a tougher recruiting environment will require considerable effort to keep each submarine manned with capable people. Young people needed for submarine and nuclear power duty will also be sought by industry to fill demanding technical and engineering jobs. Special pays like the nuclear officer accession bonus have been instrumental in attracting and recruiting these quality applicants to man our submarines.

• The unique technological talents and operational abilities of our experienced officers and enlisted personnel represent a national treasure, which, if lost, cannot be quickly replaced. Experience cannot be brought back.

— Shortages of experienced officers which prompted special pay incentives will continue despite the force draw-down, especially as the stress on our energy supplies increases civilian demand for trained engineering personnel. Special pays like nuclear officer incentive pay have been essential to retain these quality officers in numbers sufficient to adequately man reactor safety billets at sea and ashore.

— In order to continue to retain sufficient high-quality enlisted personnel, special incentive pays such as submarine pay and selected re-enlistment bonuses must also be retained. Such pays compensate for these sailors' rigorous operating schedules and for careers which will involve a high percentage of arduous sea duty.

A primary reason we have superb personnel today is because of congressional support for special incentive pays and quality of life programs. Budget pressures to reduce these programs must be resisted. Only through your continued support will we be able to recruit and retain our most valuable resource—our talented and dedicated submariners.

CONCLUSION

Undersea supremacy and maritime superiority which we enjoy today should not be relinquished for near-term fiscal considerations. The geographic and economic realities which require capable naval forces will remain forever unchanged. We know what the capability of the submarine force will be 5 years from now. The decisions made today will govern the capability of the force of the next decade and beyond. Sound military planning requires that we continue our efforts to maintain the technological edge in undersea warfare. As our Nation debates the shape of military forces which will carry us into the 21st century, the capabilities and cost-effectiveness of the submarine force will provide an invaluable contribution to our national security.

The vision of the submarine force of the future I have shared with you today and the submarine programs in the President's budget clearly strike an appropriate balance between the requirements of yesterday and those of the evolving post-cold war era.

During my former years of operational submarine command, I have seen what your exceptional support has meant to the submarine force in the fleet today. We have the highest personnel retention in years, and the submarine force operates at very high levels of readiness and meets fleet commitments. Through your interest and support, the U.S. submarine force is the best in the world today. However, that same operational experience has convinced me that this Nation will forfeit undersea superiority without *Seawolf*.

With your continued assistance, the submarine force of tomorrow will sustain its essential role in maintaining the stability and security of our Nation well into the 21st century.

Senator KENNEDY. Thank you very much, Admiral.

Admiral Williams, I will begin with you.

Your prepared testimony lists several ASW objectives for the Navy. You mentioned that your efforts in the 1980s focused on the need to support the massive resupply efforts for Europe. You also said that we need to increase our efforts to support power projection crisis response on a regional scale.

Looking at your list of objectives, however, I'm not sure that I see a difference between your view of the world that we face today and the one that we faced before the collapse of the Warsaw Pact. For example, I could just as easily imagine, reading this list of objectives, it being associated with the maritime strategy proclaimed in the early 1980s.

On page 5, you give the priority listing of the four Navy ASW objectives: one, ability to hold Soviet strategic submarines at risk; two, establish ASW sea control for power projection forces; three, monitor the level, quantity and quality of Soviet submarine activity; and, four, retain the capability to counter potential Soviet open ocean submarine capability.

I read that against what I thought was enormously interesting testimony on pages 12 and 13 of your testimony, where you are talking about increasing emphasis on regional power projection which dictates that we continue to emphasize improvements in task force ASW defenses. You talk about expanding our efforts in coastal and shallow water ASW. Then you have a rather interesting statement earlier in your testimony about what is happening to Third World submarine potential, and other points that are related thereto.

Is there a disconnect? Am I missing something?

Then we have the changes in strategies and programs by various Navy officials: adjusting strategies and programs to the radically changed circumstances where we are without the same Soviet threat. Much was made of the pronouncement.

I think Admiral Jones just referenced the same subject matter. Earlier this year, the CNO, Admiral Kelso, announced that ASW is no longer the Navy's number one priority. Its number one priority is having quality people. Admiral Jones just referenced that.

There have been changes in the level of funds requested for ASW programs. The Navy made a major adjustment in the SSN-21 *Seawolf*, its premier ASW platform. Before last summer, in the major warship review, the Navy had intended to buy the three and one-third 21s per year, and now they plan only one per year. That is because of financial pressures and not fundamentally a different strategy.

Then we come back to the *Centurion*.

I would just ask whether you feel that the points that you mentioned in your statement accurately reflect the changed conditions that we are facing.

Admiral WILLIAMS. Yes, Mr. Chairman. There is a change in the order. I don't think there is a disconnect at all. I think I can explain that to you.

In the 1980s, our forces were built to counter the Soviet threat in the blue water areas around the globe and shallow waters of the bastions.

In the 1990s, the force we will retain and build must address peacetime presence, deal with regional contingencies, and continue to pace the Soviet threat. It is important to note that regional conflict does not totally equate to shallow or coastal water as only 10 percent to 15 percent of the world's oceans really can be considered shallow.

Also, shallow water, anti-diesel ASW is not a new——

Senator KENNEDY. Admiral, on that point, we are not talking about, are we, the percent of the surface water? We are talking about where the potential conflicts are going to come in.

Does that change your statement?

Admiral WILLIAMS. Sir, there are many regional conflicts. For example, in the eastern end of the Mediterranean, which has been in crisis situation, it is deep water.

Senator KENNEDY. Yes, that's deep water.

Admiral WILLIAMS. There is some deep water and some shallow water. The East China Sea is shallow. You really have to look at it country by country.

As I said, the shallow water, anti-diesel ASW is not a new field for the Navy, as our strategy for fighting forward always included ASW against Soviet diesel submarines. Also in the Mediterranean, there is shallow water in the Aegean; for example, if we would ever fight the Soviets—and hopefully now we won't—it is shallow water. We have always had shallow water in our program. It's just that now we are emphasizing shallow water; in fact, most of our cuts came from our blue water assets, while we retain our shallow water assets with very few or almost no cuts.

Senator KENNEDY. Is that going to reflect itself on the follow-on submarine for the *Centurion*, for example? Are you going to consider the kinds of designs and capabilities to be more related to operational capability in shallower water?

Admiral WILLIAMS. I will let Admiral Jones comment on the *Centurion*. Although I am aware of it, I will let him comment on that.

I think I should explain first that the antisubmarine warfare consists generally of two sub-sets—area ASW and task force ASW. A majority of our budget cuts and the downsizing of ASW force structure have focused on area ASW, which was primarily anti-Soviet. Almost all our cuts came from there.

The reduction in SURTASS, fixed distributed systems, *Seawolf* and long-range maritime patrol aircraft are just some of the examples of the cuts we took in area ASW.

Placing 1052 class frigates in reserve status is another example of the area ASW or blue water cuts.

There has been no real plus-up in task force ASW, but we have protected most of those programs essential to meet the regional threat and still account for the Soviets.

Those systems and programs included the SQS-53C, which, for example, I used in the Mediterranean and specifically sent it to shallow water areas in the Aegean and other places to test it; active SURTASS; and ASW helicopters played big and regional task force ASW.

Our efforts in ASW weapons design and upgrades to counter the shallow water target across the spectrum of ASW platforms continues with virtually no cuts.

We are emphasizing efforts to improve our coastal and shallow water ASW performance and will continue to do so.

Although it does not show in the budget, our training exercises around the world involve many more shallow water and regional crisis scenarios than before. We have shifted our emphasis. Although we have not forgotten the blue water, we have shifted our emphasis to the regional and shallow water areas.

Senator KENNEDY. Perhaps people will be able to draw that conclusion from your response. Certainly the opening testimony leads us to another potential conclusion.

The fact, as I understand it, is 100 percent of the water where the Marine Corps would go ashore is shallow water.

Admiral WILLIAMS. Where they land, Mr. Chairman, is shallow. In many places the water just off the beach is deep, such as in that one case, for example, of Syria. You really have to go country by country.

Senator KENNEDY. We are really watching closely how the changes or the lack of changes occur in terms of strategy.

I am interested in why you believe that the Soviets are continuing to produce, whether it is the 10, 6, or 7—whatever numbers they are—not an insignificant number in terms of adding to their fleet and their maintaining their industrial capability.

Now there are those—although they are not many—that say the production is part of a 5 year program, and it is just continuing on. I don't think there are many people who buy that, although it is an argument that is put out.

Others feel that the Soviets, of all the Lehman's strategy, took most seriously the nuclear capability, the attack capability of the United States' submarines, and continue to consider that very seriously since, by and large, the greatest number that they are producing are either attack submarines or cruise submarines that can attack either surface or sub-surface, and that this is the real part of their thinking.

Obviously, it becomes less of a threat as we move from three to one in terms of the SSN-21. It seems, at least to the observer, that you have response and counter-response. We were going to go for three. Maybe there is at least a plausible justification—if the Soviets are looking at it as their own defense—in terms of their own protection of their nuclear capability, that they would make that judgment. Perhaps that is right or perhaps that is wrong. At least that is what a number of the military personnel that I have talked to have suggested.

Perhaps with just one SSN-21 you have a changed threat. What is your own sense of the reasons for it, the balance for it? What is the consistency when they are taking the troops and dissembling other kinds of capability? The Soviets are continuing to modernize SS-24s and SS-25s and all the rest. What is your own assessment—from any members of the panel—of why the Soviets continue, and what you think would influence or impact their modification of their production in this?

Mr. CANN. Mr. Chairman, I think one thing that has to be looked at carefully is they have put a lot of their submarine effort into their ballistic missile submarine program. They have built the Deltas and Typhoons. I think historically what we believe is that

the attack boats that they have been building reflect their concern about our submarines and the capability of our attack submarines. They have produced these to a large margin, in their view, to help build a layered defense to protect their ballistic missile submarines.

They have changed their operating patterns over the years and it is pretty well established. I think there are a number of factors here. I personally believe that they are going through much of the same kinds of problems that we are having in trying to adjust their industrial base in the same sense that we are going through a downsizing in our industrial base. Unfortunately, we cannot prognosticate what they will be doing over the next couple of years. I would assume that you may see them come down somewhat in their production. But, of course, they have a very well organized production capability to build these submarines.

I think that, as they see us continue to build capable submarines and maintain the current submarine force that we have, they are certainly, at least on the defensive side, going to feel obligated to make sure that they are protecting their ballistic missile submarines.

That is one aspect of it.

Of course, I have always personally believed that the Soviets clearly understand the sea control problem. Since they do not own control of the airspace, if they are going to have any influence at all in wide regions of the ocean, the Soviets need to have nuclear attack submarines that are very capable if they want to operate without benefit of air cover.

I believe that is an important consideration.

Senator KENNEDY. Senator Cohen.

Senator COHEN. Thank you, Mr. Chairman. It is important that you raise this issue. We come back to the old argument of capabilities versus intent.

I know that many people are fond of pointing out, to the chagrin of the administration, that up until July 29 of last year, we were treating Saddam Hussein as a non-aggressor. In fact, the administration lobbied very hard to prevent us from taking any congressional action that would impose sanctions upon Saddam Hussein. Then, a week later, of course, he went into Kuwait.

In respect to where we are going with the Soviet Union, I don't think anyone can predict. Yesterday, 2 days ago, Mr. Gorbachev said that he needs aid desperately, and indeed he does. He also went on to say "no conditions, gentlemen. Don't try to impose any kind of strictures upon our economy because that is unacceptable. In the event that you do not provide the aid, you run the risk that we will return to the Cold War."

That is sort of one of these implicit threats: pay me before I kill again.

I think, and hope, that that is an idle threat on their part. Nonetheless, it is one that we ought to take into account.

Secretary Cann, I don't want to ignore you. You have been sitting there for some time not really being questioned directly about some of the more technical aspects.

My understanding is the Navy is planning on using an 80/20 cost sharing arrangement on future *Seawolf* ships.

Mr. CANN. I do not necessarily see that happening in the future. We used an 80/20 share-line on the first ship. We plan to use the 80/20 share-line on the fiscal year 1991 ship again.

Senator COHEN. Okay. I take it, then, that you are not planning to have an 80/20 share-line for future ships?

Mr. CANN. I don't see that going forward at all.

Senator COHEN. After all, the Navy is using a 50/50 share-line for the construction of the *Arleigh Burke*, and then we would want to get into some numbers in terms of what the obligation is.

Mr. CANN. By August, I am committed to providing the Under Secretary of Defense for Acquisition a plan for the 1992-1993-1994 *Seawolf* submarine program in terms of how we are going to approach the acquisition strategy for those 3 years.

Senator COHEN. What can you tell us about the electromagnetic countermeasure launcher, which I understand is being developed by a Massachusetts company? That is funded in DARPA now.

What is the status? Is DARPA going to continue to fund that in the next fiscal year?

Mr. CANN. As a result of interest by this subcommittee, I took a close look at the program. As a result of my examination, I have some issues that I have to take up with my own people.

There has been an effort that DARPA funded, and at the same time, one of our laboratories also came up with a concept. I am personally committed to ensuring that when we develop something in industry, we support it and then use it because that is the purpose of our participation in small business activity. It is part of our industrial base.

Senator COHEN. Does the Navy intend to fund it or not?

Mr. CANN. I intend to meet with the people and make sure that we follow through on this particular project.

Senator COHEN. I will leave that for Senator Kennedy to pursue on his time.

My understanding is that last Tuesday, the Navy released a termination notice for the signal processor called the EMSP made by AT&T, but that Congressman Murtha then asked you to call back the termination notice, and you are now reevaluating the program.

I don't have any particular interest, any local interest, in this. Could you tell us what is going on with this?

You spent about $700 million on this project so far. Why the proposed notice of termination and what is the purpose, other than responding to a congressional request, for recalling the termination notice?

Mr. CANN. The EMSP, which stands for Enhanced Modular Signal Processor, which was to be a standard in ASW programs, was started about 1981. It was to be a follow-on to a processor we had been building for some time. It was sometime around 1986 or so when it was predicted to be a standard.

There was an original EMSP system called the SEM B system. That was a very large piece of hardware which would go in submarines and surface ships fairly conveniently, but it was clear that it could not be flown in aircraft, and there were emerging aircraft requirements.

A decision was made in 1987 to start a smaller version called SEM-E. These reduced sized modules take advantage of advanced

electronics. We intend to proliferate these throughout the various systems.

At the time the decision was made in 1987, there were some 1,300 or 1,400 potential units to put EMSP in.

As the budget crunch became more obvious and as we actually started to take the reductions that were necessitated by the budget summit of last summer and also by changing priorities, much of the EMSP user base disappeared. As a matter of fact, just about a year ago, that market went from 1,300 down to 500 units and in looking at where we are today, that market has slipped to an optimistic market projection of some 150 units.

So, there were several things that happened. AT&T, who is the contractor, felt they needed a commitment from the Navy for a certain number of units. They recently indicated that they needed some 27 units a year, with a multi-year guarantee, in order to continue the program. Also, the price of the AT&T units, compared to some potential commercial alternatives that were coming along, was quite high.

We were considering termination of this program. AT&T came in yesterday, as a matter of fact, and has made us an offer on the program that looks attractive. If it is as attractive as it seems to be, I am going to reconsider this entire matter over the next few days because it would be a very attractive offer.

Senator COHEN. Is it a situation where the marketplace actually got ahead of the Navy, in other words?

Mr. CANN. I think there have been a number of lessons learned, like in everything we do.

One of the problems with establishing a standard, in the sense that we established the EMSP as a standard, is that it's very difficult to, say, go put this in a series of systems that are being developed before you actually have the device in hand. That's what happened, among other things.

Senator COHEN. We could pursue that a little bit later. My time is up, Mr. Chairman.

Senator KENNEDY. Senator Gore.

Senator GORE. Thank you very much, Mr. Chairman.

Secretary Cann, I would like to ask you about the study on the ASW stand-off weapon. How is that proceeding?

Mr. CANN. I understand the study is proceeding very well. On the 9th of July, I intend to go to New London and have a complete review of the study.

As you know, there has been a lot of discussion about Sea Lance and the Vertical Launch ASROC. They have gone through various evolutions.

One of the difficulties with ASW stand-off weapons is that they are expensive and very difficult to target. From my perspective, what I need to understand, before we can make any rational decisions about where we go with these ASW stand-off weapons or other versions of stand-off weapons is to make sure that, if we are going to spend any more money on these types of weapons, we can assure ourselves that they will, in fact, work as advertised in a systems context.

Many of these programs were started originally based on individual subsystem capabilities, without looking at the end-to-end

system requirements. So, if you are going to have a weapon that is going to cost in excess of $1 million, I would like to make sure that it has a probability of kill, from detection to kill, of a significant value that makes it a cost effective weapon to build and put into the fleet. That is the purpose of the study.

The study will be available in July.

Senator GORE. Will you be the person reviewing that study?

Mr. CANN. Absolutely.

Senator GORE. Are there two principal alternatives?

Mr. CANN. There are at least two principal alternatives. There are ballistic type alternatives, which are ASROC and Sea Lance. ASROC is a short-range weapon; Sea Lance is a longer-range weapon. Then there are some other concepts that make use of cruise missile carrying concepts.

Senator GORE. The Sea Lance was taken out of the budget by the Department last year and the committee put it back in. The study we're talking about came as an initiative at that time. Correct?

Mr. CANN. The study came as a result of a number of issues.

Senator GORE. Did we initiate the study or did you?

Mr. CANN. You asked for a study. I initiated the study. To be perfectly frank, I didn't realize that you had asked for the study until after the fact.

Senator GORE. You initiated it without us?

Mr. CANN. Yes, sir.

Senator GORE. Are there three principal alternatives then: a ballistic missile system; the Sea Lance system; and the cruise missile system?

Mr. CANN. The Ballistic System includes the ASROC, the Vertical Launch ASROC.

Senator GORE. Yes. Sea Lance would be ballistic, as well as ASROC, but longer range, correct?

Mr. CANN. That's right. Yes, sir.

Senator GORE. There are certain improvements to the Sea Lance system that are also a part of the study, is that correct?

Mr. CANN. I would have to check.

I issued the direction for the study. I talked to the person running the study. But, I have not had an opportunity to really look at the study in detail. I know what they're doing, but I don't know the details of the specifics being considered.

Senator GORE. Did you outline the alternatives to look at?

Mr. CANN. I asked them to look at all of the alternatives.

Senator GORE. You came into this position when? Was it last year?

Mr. CANN. March 1990.

Senator GORE. March 1990. Immediately before that, you were head of the Undersea Warfare Center for General Dynamics, correct?

Mr. CANN. That's correct.

Senator GORE. Did you participate in the design of the Tomahawk alternative to Sea Lance?

Mr. CANN. The original Tomahawk alternative to Sea Lance was an idea that was created about 1980. I was in the government in 1980 as the Principal Deputy assistant Secretary for Research, Engineering and Systems. At the time, the concept was rejected by

the Navy in favor of the current Sea Lance for a number of technical reasons.

When I was at General Dynamics in 1987, I decided to revisit that cruise missile concept.

Senator GORE. This was one of your babies when you were at General Dynamics?

Mr. CANN. I would say that this was an idea that I thought was worthy of reexamination.

Senator GORE. Immediately after you left General Dynamics and came into the position you now have, the Sea Lance was canceled and this alternative became one of the "dogs in the hunt?"

Mr. CANN. Not quite correct, sir.

Sea Lance was canceled before I returned to the government.

Senator GORE. I thought it was canceled in the last budget?

Mr. CANN. It had already been taken out of the budget when I was confirmed. By the time I got there, it was not in the budget, as I remember it.

To be perfectly candid, I have studiously avoided promoting the cruise missile concept since I returned to government service. I told the study team to look at all possible options, and they discussed the cruise missile. I said you ought to look at it and decide for yourself whether it makes any sense. I am not promoting any specific concept.

Senator GORE. Do you feel at all uncomfortable reviewing this study and being the person in charge of this? In your comments that you made just a moment ago, you talked about the importance of it being self-contained and so forth. Do you feel at all uncomfortable presiding over a process which may end up recommending a weapon system with which you personally were closely identified and which your company, the company that you were with just last year, is competing in the competition that you are now overseeing?

Mr. CANN. I have to make several comments here since you brought this up.

First of all, I, in the process of being confirmed by this committee, demonstrated that I have no financial ties to General Dynamics. I was with them for 2 years. I was involved in their evaluation of this concept back in 1980. As a matter of fact, I am probably the one who had more influence on it not becoming a stand-off weapon concept in 1980 for some other technical reasons. Whatever comes out of this study does not necessarily become the Navy's program. We still have to debate the issue of affordability, what we want to do, if we do it, and so forth.

This is strictly a study to determine what concepts will work and under what conditions. I am certainly not the only one in this discussion. The CNO and other people will be heavily involved in any decisions that are made.

Do I feel uncomfortable? I do not because my job is to give the Navy the best capability possible, and if it makes sense, if it really makes sense and everybody agrees, I would have no compunctions about recommending it.

I have no financial interest in it. I am trying to make sure that the Navy gets the best equipment.

Senator GORE. My time has expired. I would just like to have a brief concluding comment, if it is all right.

As a technical point, I would like to note for the record that the Sea Lance was canceled in the February, 1990 budget, and you officially came on board March 12 of 1990.

Mr. CANN. Right.

Senator GORE. I would just say that I think that you should look into this. I will leave it at that, and we will come back to it another time.

Thank you, Mr. Chairman.

Senator KENNEDY. Thank you. Senator McCain.

Senator COHEN. May I just say that I hope the record is clear that Mr. Cann had nothing to do with the decision to cancel Sea Lance. That ought to be perfectly clear for the record. The implication that somehow he is seeking or did seek to benefit a former employer I think is not warranted.

Senator MCCAIN. I'm sure he's pleased to hear that we are going to go back and visit it another time, too, Al.

Senator GORE. I want to revisit the issue of the competition between the systems.

Let me just say, since this has been commented upon, that I think what is involved here is this. I am not raising a question of integrity, and I clarified for the record that the cancellation was in February 1990 and that you came on board in March 1990. I do think the record ought to show that.

You were in the Department of Defense and then you went into the private sector. Then you came back into the Department of Defense and, presumably, when you get through with this tour, you'll go back into the private sector.

It seems to me that, when people are coming in and out of the Defense Department and the defense contracting community on a repeat basis, it is a little raw to be in charge of a weapon system, personally identified with it, an advocate and pushing it, and then be the person in charge of making a decision on whether or not that weapon system is going to displace the one that is currently performing the operational mission.

Again, I don't raise an issue about your integrity at all. It is fair to say, then, what is the implication? The implication is simply this: the public deserves to have confidence that we are being extra scrupulous and remaining at arms length in spending the taxpayers' dollars. When we have the revolving door situation, extra care is needed to not just shift responsibilities over to the same weapon system.

Mr. CANN. Mr. Chairman, may I make a comment?

Senator KENNEDY. Please.

Mr. CANN. I feel compelled to make a couple of comments.

First, when I came back to the government, I took special pains to avoid just the sort of thing that you are talking about. There was no requirement for me to do any recusal whatsoever. I recused myself for 1 year from making any financial decisions relative to General Dynamics. The Secretary of the Navy made all the decisions related to General Dynamics up through March 12, 1991.

Second, my personal history in 37 years in this business and 25 of those years closely associated with ASW is such that I am not an advocate for anything. I have made my career and my reputation based on my technical judgment. I will provide recommendations

after the study is over. The study should recommend on its own merits what it thinks is best. If I ratify a recommendation that says "the cruise missile approach is the best approach," I would only do so because I would be prepared to defend that decision based on technical merits.

Now, with respect to the future, I would also like to point out, frankly, that I'm 60 years old and plan to stay in my position for another few years. With the ethics laws being such as they are, I don't have any belief whatsoever that I am going to be going back to the industry and promoting any systems that I have been involved in since I have been in the government because, according to the ethics law, which went back into force on June 1, I won't be permitted to.

I really have to say that I came back to the government and took a tremendous reduction in both salary and benefits, as well as a number of other things, because I thought it was an important thing to do.

Senator McCAIN. Mr. Chairman, I think my time has expired. [Laughter.]

Senator KENNEDY. The Senator is now recognized.

Senator McCAIN. Thank you, Mr. Chairman.

Welcome, Admiral Williams and Admiral Jones, and Secretary Cann. We appreciate your testimony.

First of all, I would like to say that I think you should view with great interest the questions by the Chairman because I think that he is making some very valid points.

Admiral Jones, I have to question some of your assumptions. The first one is that the end of the Cold War has brought more instability than peace.

I think if you define that in the most narrow fashion, that may be true. There are problems in Ethiopia, Liberia and other parts of the world. But I don't know of anyone who believes that the end of the Cold War has done anything but enhance the prospects for peace for a variety of reasons.

If you are talking about instability, as I say, in the narrowest terms, you are correct. In the broadest terms, there is no longer a threat to the extinction of civilization as we know it, which was indeed the case for some 45 years.

I would be very careful how you phrase your statements because if we question your assumptions and don't accept those assumptions, then, of course, it is very difficult to accept your arguments for the weapon systems themselves.

I do not disagree with your second assumption that the United States cannot afford to relinquish its maritime superiority.

Admiral Jones, we are in the whole area of affordability: what can we afford and what can't we afford? We cannot afford a whole lot of other things. We cannot afford to sacrifice air superiority over the battlefield. We can't afford to sacrifice artillery superiority in the case of the battlefield, et cetera, et cetera.

When we are talking about a weapon system that is costing, as is my understanding, in the case of the *Seawolf*, $2 billion to $2.5 billion per copy, then, of course, we have to evaluate it in the whole post-Cold War scenario. Although you in your statement say that the *Centurion* is not to be a replacement for the *Seawolf*, I guaran-

tee you that we had better look at something that reduces the cost of this weapon system. The Navy's budget, in my view, is probably not large enough to absorb the cost of the *Seawolf* submarine in any significant numbers.

On the one hand, you express legitimate concerns about the number of submarines that the Soviets are constructing, albeit some of them, as was pointed out by the Chairman, are conventionally powered. On the other hand, we are producing such a high priced submarine that we can only afford one a year.

I submit to you that, given budget constraints and further reductions in the defense budget, we cannot do both. You are going to be faced with the problem of numbers forever if the Navy is going to insist on investing these large amounts of money in one submarine. There is just no other way because those of us that are involved in the budget process see no likelihood of an increase in the defense budget in the near future. There are, as we all know, significant competing priorities.

I would suggest to you that we should reevaluate the threat, and that threat as Senator Cohen pointed out, could change. I do not believe that it is likely that the Soviet Union would be involved in a naval battle with us, which would require some of the capability that has been put into the *Seawolf* submarine. This capability was appropriately required several years ago when this submarine was contemplated and planned.

I also remember very well a hearing before this committee a couple of years ago which, frankly, had not convinced me then that the *Seawolf* is a quantum leap. The argument that it is a quantum leap is just not valid.

Let me just refer to your statement. You call it a truly revolutionary improvement in warfighting capability. Perhaps you can tell me the revolutionary aspects of the *Seawolf's* warfighting capability.

Mr. CANN. There are a number of aspects to this issue. We cannot get into performance numbers, because we would then have to go into closed session, I would be happy to discuss specific performance characteristics either in closed session or off-line.

The quiet speed of this submarine is certainly going to be significantly better than anything we have had before. The quieting aspects to this submarine are considerable, in terms of absolute quietness compared to current submarines.

Senator MCCAIN. That's revolutionary in your view, Mr. Cann?

Mr. CANN. May I finish?

Senator MCCAIN. Excuse me for interrupting. I'm sorry.

Mr. CANN. In addition to quieting, the *Seawolf* will have the wide aperture array. The capabilities of the wide aperture array that we have demonstrated through sea tests in terms of its ability to operate at high speeds and do passive tracking and target and transition-to-targets to be used with our torpedoes is, frankly, in my judgment, compared to anything we have ever had in the past, a revolutionary type of capability.

You factor into that the addition of a 30 inch torpedo tube. The 30 inch tube for the first time gives us the ability to start to expand our weapon and off-board sensor concepts. As you know, we have been limited by the current 21 inch tube for the entire history

of our submarine force. Compared to the kinds of things we have lived with for the last 40 years, these are, when taken together, in my judgment, a revolutionary concept.

[The information follows:]

The major part of *Seawolf*'s warfighting capability improvement stems from its unprecedented level of quieting. This improvement was made possible by extensively quieting the propulsion plant and replacing the propeller with an entirely new concept for submarine propulsion, the propulsor. Coupled with redesign of virtually every piece of auxiliary equipment and extensive sound isolation techniques, the end result will be a submarine which is over 10 times quieter than an Improved SSN-688 class submarine. Although significant improvements in submarine silencing have been made over the years, no submarine class has ever been designed with this magnitude of improvement in quieting over a previous class (e.g., the first *Los Angeles* class submarine, when introduced, was about twice as quiet as the previous SSN-637 class).

This improvement in platform quieting, in itself, would provide *Seawolf* with a major leap in warfighting capability. But the improvements designed into *Seawolf* do not stop there. The *Seawolf* sensor suite (part of its AN/BSY-2 combat system) also represents a major leap in overall capability, the magnitude of which has not been seen since the introduction of the AN/BQQ-2 sonar with the SSN-637 class in the early 1960s. While the Improved SSN-688 doubled the detection range achieved by the SSN-637, *Seawolf* will more than triple the Improved SSN-688 search rate. This will result in a much larger volume of ocean that can be searched, and coupled with its superior quieting, will double the speed at which *Seawolf* can retain tactical control over the most capable threat. *Seawolf* will be able to detect, track, and engage the most quiet modern submarines at greatly increased ranges.

Seawolf's vastly improved quieting and sensor capability are further complemented by significant improvements in its weapons launch systems and stowage capacity. *Seawolf* will be the first submarine equipped with large diameter torpedo tubes, allowing for much greater flexibility in weapons design, as well as potential use of unmanned underwater vehicles (UUVs). *Seawolf* will also be able to launch weapons without producing a detectable noise transient. This has not been possible before, and will give *Seawolf* unique flexibility in tactical engagements. In addition, *Seawolf* doubles the torpedo room weapons load of earlier attack submarines.

Seawolf also has the highest top speed of any previous submarine class, is deeper diving, more survivable, and has significant room for growth. Taken together, the Navy stands by its assessment that the improvements and capabilities represented by *Seawolf* are revolutionary. If we made such improvements in an aircraft, they would certainly be considered revolutionary; i.e., one tenth as detectable, over three times the target detection range, twice the tactical speed, twice the firepower, etc. *Seawolf*'s improvements are not simply minor upgrades to existing systems, but are the result of major technological developments achieved through years of dedicated R&D effort. *Seawolf* will restore a margin of tactical superiority over the threat that our submarine force has not enjoyed since the early 1960s. It will be the finest submarine in the world well into the next century.

Senator McCain. Thank you.

I would suggest that that view is not shared by most experts on submarine warfare that I have discussed the *Seawolf* with, and I think you are guilty of exaggerating the significant differences between the *Seawolf* and the *Los Angeles* class submarine.

I would just like to say, Mr. Chairman, that I would urge the Navy to give us a date as to when they could possibly have some more concrete information on the *Centurion* because I am of the mindset that we just simply cannot afford this kind of expensive weapon system, given the budgetary constraints that we are laboring under.

Thank you, Mr. Chairman.

Senator Kennedy. Thank you.

Secretary Cann, you said you can't discuss the pending court case or the award of the fiscal year 1991 SSN-21 *Seawolf* contract,

and I understand that. Nevertheless, what can you tell us about the impact of the delay on the 1992 and later SSN-21 programs?

Mr. CANN. From my point of view, the fiscal year 1992 and later submarines are independent in the sense that there will be a separate solicitation. Even if the fiscal year 1991 ship were to slip so that there were two ships being built at the same time, the capacity of either yard is such that it would not have a large impact.

So, I don't really see a material impact by this court case on the fiscal year 1992 award.

Senator KENNEDY. What do your legal advisors tell you about the timeliness of a decision on the court case?

Mr. CANN. Right now, there are some discussions going on. At the present time, unless there is an appeal filed or a permanent injunction sought, we go to trial on July 11.

The earliest we think anything could be resolved through appeal or any other facet would be probably in the September-October timeframe. After that, I just cannot even guess.

Senator KENNEDY. It could go on for an extensive period of time?

Mr. CANN. We would hope that we could resolve all of this by September or October in one fashion or another.

Senator KENNEDY. All right.

To come back to the *Centurion*, you indicated, Secretary Cann, that the new attack submarine would enter the service at about the time the first SSN-688 class began to retire. If they retired on a normal schedule, it would mean delivery of the new submarine about the year 2007.

This would also imply building the lead ship of the new class about the year 2000.

You also mentioned the goal of reducing costs to the point where they can afford to buy more than one submarine at a time.

Do you have a cost goal in mind?

Mr. CANN. We have had significant debates about that. We have not set a specific cost goal yet. I would personally like to see us hopefully build on the order of two submarines for the price of one current SSN-21. We have not formally set that goal. I have not yet seen the OP-02 requirements. I have to get a series of point designs and break point analyses done to see what it would really cost to build a submarine of the type that will be recommended.

Of course, it will be clearly smaller. It will clearly have less of a combat system. It will have a number of other features. The issue is to make sure that it represents something that we are willing to go to sea with as a combatant.

Senator KENNEDY. Have you laid out each milestone for this?

Mr. CANN. Not yet.

Senator KENNEDY. You talked about smaller, different combat systems. As I understand the principal elements in the design, given the three—speed, quietness, and weapons—what kind of guidance are you giving to the designers? Is this going to be the follow-on of the *Seawolf* to deal with sort of a blue water kind of potential confrontation, or is it going to be designed to deal with more of the Third World kind of conditions?

Mr. CANN. I am going to ask Admiral Jones to comment in a minute. From my point of view, what I have been trying to press the system to look at is modularity. Because of modern electronics,

the issue centers on load-out of weapons and having the right fire control system and various sundry other issues. The submarine could be reconfigurable to do different missions as long as they knew ahead of time what they were going to do.

Obviously, you won't carry everything at the same time. With modern electronics and the fact that most of the equipment is going to be computer based, you should be able to reconfigure the submarine with different weapons for different missions.

I am sure Admiral Jones would like to add to that.

Admiral JONES. Thank you, sir.

As I mentioned, the characteristics that we looked at are the basic characteristics of any submarine. You have to start out first with what we perceive the mission and the threat for that submarine to be.

As you get into the individual——

Senator KENNEDY. What is that now? Is that a follow-on to the SSN-21 dealing with the Soviet threat?

Admiral JONES. Yes, sir. We are looking at the projected threat including both the Soviets and the Third World. We tasked the intelligence people to give us the best estimate of the threat at the time the ship will be brought on.

Senator KENNEDY. What is it? Can you help us there?

Admiral JONES. It's about 2010.

When we looked at the Soviets, the best estimates that we had—I believe we mentioned these earlier—showed that they will continue to build and modernize and will be very formidable at that time.

Right now, the Soviet submarine force is about 30 percent modern. By the time the new submarine comes in, about 90 percent of their submarines will be modern. They will have gotten rid of their older ones. We will still be at a disadvantage of about two to one.

So the capabilities of this ship will have to meet that threat.

As we expand and we look at the world situation and Third World conflict, again our submarines are strategic ones. We can easily see the nuclear deterrent there. The attack submarine is a deterrent against any Third World countries that would want to deny us the use of the sea. We have to be able to operate with the battle group and be able to work in the integrated way that Admiral Williams talked about earlier.

When you put that together with our special warfare, I&W, and intelligence collection missions, it gives you an idea of the capabilities that we have to have. That does not give you any cost estimate.

We had to look at each area, and ask, what are the options? For each option there will be a cost. Take speed, for example. The faster we want to go, the more money it is going to cost. What is the right value? How many weapons will it have to carry? If you want to carry more, the ship will have to be larger.

Senator KENNEDY. Excuse me for interrupting, but we are running into a time problem. Is this going to be a camel or is this going to be a race horse? I mean, is this going to be decided by a committee? Are you just listing off all the possibilities?

Admiral JONES. No, sir.

The CNO's guidance to us was to make the most affordable platform—that is the way ahead—the most affordable platform we can to meet the mission requirements.

We are looking in every area to minimize cost on this submarine. What we have done is to look at the individual pieces so far. When we put those pieces together into designs, then we will see how much this ship will really cost. That is why it is too early to come in and say what it could cost now.

There are a lot of things in R&D that are out there that say that we should be able to get better sensors cheaper; that we should be able to reduce the weight of the ship because of materials. There are different designs for making it quieter and cheaper than what we can do today. We are also looking at redundancy, with the aim of reducing the number of things required.

In every aspect of this design we are looking at affordability but still have it capable of doing its job.

Senator KENNEDY. Thank you. Senator Cohen.

Senator COHEN. Mr. Chairman, I have a number of questions that I will submit for the record, and I will just ask one of Secretary Cann.

My understanding is that for a number of years, now, the House of Representatives Appropriations Committee has been adding funds for a computer display called the Advanced Video Processor, and that the Navy, as a matter of fact, last year mandated that this be used as the principal sonar display in basically all the surface ships—including the *Arleigh Burke* destroyer—and that the Navy has some reservations about this.

I was wondering if it had reservations at the time.

Then, last month, you apparently awarded a contract of some $29 million for the procurement of the AVP. I guess this system is going to be the sonar display for use throughout the surface Navy.

Could you tell me basically what criteria you are going to use for evaluating its capabilities? Number one, what were the Navy's reservations? Number two, what are the criteria that you are going to use?

Mr. CANN. The original problem with the AVP, which was a competitively won program by a small company, was that they were having technical difficulties with it, and the program was not moving.

It was originally envisioned as a standard, as I understand it. They started to have a great deal of difficulty, and there was some conflicting congressional language last year. They wanted us to go into production before it was ready to be put into production because it had not met its requirements. Quite a discussion went on over a period of time as to what it would take to get this thing completed.

We finally reached an agreement with the company, and they are now completing the development. It appears to work as advertised. What we are going to do is buy a limited number of these to put them into, I believe, the SQQ-89 to evaluate them. They could, in competition with some other things, become a standard, depending on how well they work in that environment.

Senator COHEN. Do you have established criteria that you are going to insist that it measure up to?

Mr. CANN. Oh, absolutely. I would be happy to supply that for the record. I don't have that information today.

[The information follows:]

The established criteria for the Advanced Video Processor (AVP) is contained in "Prime Item Development Specification," (PIDS) document number PEO/SASS-PMO411-91-PIDS-002.2 dated May 15, 1991.

The PIDS, consisting of approximately 2 hundred pages, establishes the detailed performance, design, development and test requirements for the AVP. To summarize in an acoustic system operational context, AVP is required to process, store, and display specialized acoustic formats, routine text, and graphic acoustic image data; AVP shall interface with standard display equipment and Navy processors to process and display incoming data accurately with no data loss or corruption under man/machine interface control.

Because of the scope and detailed technical nature of the PIDS, it is judged inappropriate to include in testimony. Copies of the PIDS can be provided upon request.

Senator COHEN. I have some other questions, Mr. Secretary, but I will give you those for the record.

Senator KENNEDY. Thank you. Senator Gore.

Senator GORE. I will be brief, Mr. Chairman. I want to ask some more questions about the ASW stand-off weapon.

How far away from the submarines that we're trying to find do we have to be for this particular mission? How far out are we trying to reach with this weapon?

Mr. CANN. Obviously, on an ASW stand-off weapon, you would like to engage him as soon as you detect him. You would like to detect him far enough away, if you could, so that you could preclude him, first, from shooting a cruise missile at you or, two, certainly before he fires a torpedo at you.

Senator GORE. If this gets into a classification level that is not appropriate here, you stop me. I am looking for a distance. How many miles?

Mr. CANN. Well, for torpedoes, you would certainly like to engage him outside of, say for the sake of discussion, 10,000 or 20,000 yards, and for cruise missiles, you would like to engage him outside of 30 to 60 miles, maybe even greater.

Senator GORE. Is it possible that advanced sonar developments now in the pipeline will affect this debate over what kind of ASW stand-off weapon is best?

Mr. CANN. Absolutely.

Senator GORE. On the Tomahawk option, is an extensive redesign required there or not? Can it just be packed into the regular Tomahawk?

Mr. CANN. If you were to use that concept, you would use the same envelope for the missile, and you would use the same engine. Basically, much of the avionics that are in the missile would be the same. What I would call the containment package—the front end of the missile—would have to be different. Absolutely.

Senator GORE. Would you characterize the degree of redesign necessary as extensive?

Mr. CANN. Compared to what? Certainly it is extensive in terms of what it would look like. On the outside of the missile, it would look exactly the same. Obviously, you would have to make a number of accommodations. Compared to starting from scratch, though, it would not be extensive.

Senator GORE. Just describe briefly the things that would be squeezed into it.

You have sonobuoys, right?

Mr. CANN. Right.

Senator GORE. What else?

Mr. CANN. You would carry a MK-50 torpedo.

Senator GORE. Anything else?

Mr. CANN. You would carry an active source.

Senator GORE. Pardon me?

Mr. CANN. An active source.

Senator GORE. New, high wing stowage, a longer wing, new fuel tank, new flight control, new missile cabling.

You can respond for the record on that, if you would like.

What about in evaluating system costs, do you take into account false alarm costs? Is that a common thing or an uncommon thing, to have a false alarm and shoot one of these things?

Mr. CANN. One of the big problems with all ASW weapons is high false alarm rates.

Senator GORE. It is common?

Mr. CANN. Oh, it's very common. That is one of the problems.

What you would like to do is get to the point where you have as low a false alarm rate as possible, so that you do not expend weapons needlessly.

There was a very famous story during the Falklands crisis. The British were operating down there, and they thought they saw a submarine, and they dumped weapons on a spot in the ocean.

One of the concerns is that we would not have a lot of weapons, especially stand-off weapons of any kind. We need to make sure that if we have any stand-off weapon—it is really a function of the sensor system, more than it is over the weapon. Make sure that the false alarm rate is low enough to make it possible for you to shoot one of these weapons with a reasonable probability of kill.

Senator GORE. On the other hand, if you have a system that is designed to improve your sensor capability by dropping sonobuoys, after it is fired and the sonobuoys are dropped, is that recoverable? Is the rest of it recoverable?

Mr. CANN. No, it isn't.

Senator GORE. You lose the whole package before you get the improved sensor information, which is what you are relying on, in part, to cut down on you false alarm rate.

Mr. CANN. No. I think there is a misconception here.

The false alarm issue is totally dependent on the primary sensor.

Senator GORE. The first detection.

Mr. CANN. If you have convinced yourself that it isn't a false alarm, that you have a real target, the thing that the weapon would do with the sonobuoys would be to improve your localization accuracy.

Senator GORE. That is the point I wanted to make. The sonobuoys will not cut down on the false alarm rate, at all.

Mr. CANN. Absolutely not.

Senator GORE. Yet, they will add to the expense of the total system, which is lost every time there is a false alarm. Correct?

Mr. CANN. But, it will certainly improve if it works. It will certainly improve the localization. The problem with our stand-off

weapons has to do with the fundamental problem of the time lag inherent in the launch of the weapon and the flight time to the target. This time lag is not a good match with the sensor capability of the torpedo, which then has to get in the water and find the target. That is the fundamental problem with stand-off weapons.

Therefore, what we need to try to do in one form or another—and, by the way, there are other ways to look at this. We need to improve the ability of the sensor and the localization process such that if you fire a weapon, you have a high probability of kill.

Now there are some auxiliary schemes that we are also looking at, which says that if you have LAMPS in the area, you can use LAMPS as a sensor and localization scheme.

Senator GORE. One final question.

When the study is completed this summer, will you be the person who makes the initial decision on which system to recommend up on the line?

Mr. CANN. That's not the way I plan to do it, but I am the first person to do something with it.

Senator GORE. Thank you.

Thank you, Mr. Chairman.

Senator KENNEDY. Let me just make one final point, and then I will submit my further questions to you for the record.

This deals with something Senator McCain and Admiral Jones mentioned.

Both mentioned favorably the Navy DARPA Advanced Submarine Technology. It would seem to me the emergence of the requirement to investigate the options in the *Centurion* program suggests that this program is even more important than it was before.

I understand th[illegible] for fiscal year 1992, DARPA allocated $55 million. The Navy allocated $36 million for the efforts.

I also understand the original submarine technology plan submitted to Congress called for DARPA alone to spend about $110 million in 1992.

Is there anything, other than budget pressure, that has caused a restructuring of the overall effort?

Mr. CANN. Not that I know of. We are 100 percent behind the DARPA effort. It has been a wonderful effort. If there were more money, I could list some things that I think are very important that they ought to be pursuing. It really has just been an excellent effort.

Senator KENNEDY. I think, as we are looking down the road toward the design of the *Centurion*, it becomes of greater significance and importance. I will have a follow-on question just in terms of what you might consider to be valuable and useful developments that you think may have a relationship to the *Centurion*. At least as far as I am concerned, this moves us into a higher priority.

Let me submit a question to you, and you can let us know and see what can be done.

Mr. CANN. Yes, sir.

Senator KENNEDY. I want to thank you all very much for being here this morning. We will submit some additional questions to you, and I would appreciate your responses.

Thank you.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR EDWARD M. KENNEDY

P-3 PROCUREMENT

Senator KENNEDY. Secretary Cann, we are all well aware of the Navy's decision last year to cancel the P-7 program, an aircraft that was to replace older P-3 ASW patrol aircraft in the Navy's inventory. I understand that the Navy may be considering, in the aftermath of this cancellation, a program to procure new P-3 aircraft to take advantage of the fact that the South Korean Government has ordered some of the aircraft and reopened the production line. What is the Navy's position on this issue?

Mr. CANN. The Lockheed P-3 production line is reopening with the Republic of Korea (ROK) order (commercial sale) for eight P-3C Update III aircraft. These aircraft are to deliver during calendar year 1995 from a line that is being moved to Marietta, Georgia. The reopening of this production line presents the Navy with a unique window of opportunity to build a minimally modified P-3 that will meet most of the critical mission requirements with a low risk program. This appears to be the only viable option to meet near term Navy MPA inventory requirements. The Navy is currently conducting discussions with Lockheed on this alternative program.

Senator KENNEDY. Secretary Cann and Admiral Jones, both of you mentioned favorably the Navy-DARPA Advanced Submarine Technology Program. It would seem to me that, with the emergence of the requirement to investigate options in the *Centurion* program, this program is even more important than it was before. I also understand that for fiscal year 1992, DARPA has allocated about $55 million and the Navy has allocated $36 million for these efforts. I also understand that the original submarine technology plan submitted to Congress called for DARPA alone to spend about $110 million in fiscal year 1992. You said that there was nothing, other than budget pressure, that has caused a restructuring of the overall effort. Could you describe some of the technology efforts that had to be cut back to fit within available funding, but that would be important to deciding on the broad design characteristics of *Centurion* effort?

Admiral JONES. The Navy's $36 million in fiscal year 1992 consists of: $17.6 million for modification of the R&D submarine; $5.4 million for operation of the Large Scale Vehicle; $4.0 million for the SSN Security Program; and $8.6 million for advanced development of electromagnetic signature technologies, non-CFC refrigeration units, non-penetrating periscopes, and composite propulsion shafting.

Listed below are technologies that cannot be developed within available funding but are important to consider in a new SSN design.

— Design, fabrication and start of testing of a hull plug using technology from France and the Netherlands which enables major component replacement without costly hull cuts and rewelding.

— Accelerated transition to advanced development of the following DARPA technologies which can potentially reduce submarine size and cost without sacrificing performance:

— NiCd Batteries
— Advanced Life Support System
— Flap-Assisted Control Surfaces
— SUPERLITE Propulsor
— In-Line Shaftless Pump
— Non-Penetrating Periscope

— Transition to advanced development the following Navy 6.2 and industry technologies which can potentially reduce submarine size, weight, or manning, or enhance safety:

— High Speed Diesel Generator
— Gas Generator Emergency Main Ballast Tank (EMBT) Blow System
— Single Man Ship Control Station
— Advanced Acoustic Silencing Methods
— Battery Casualty System
— Fire Protection System
— Smoke and Toxic Gas Control

— Ship impact and concept design studies of alternative technologies and design methods which reduce submarine design and/or construction costs:

— Weight Reducing Shock Design Procedures
— Fiber Optic Ship Data System
— Automatic Weapons Handling and Storage Systems

— Lightweight, quieting propulsor: Modifications to the large scale vehicle to permit evaluation of advanced development propulsor alternatives derived from the DARPA and SSN-21 propulsor R&D programs.

— DARPA Radiated Noise Project F: initiate advanced development for a prototype system.

— LFAA countermeasures: Modeling and prototype testing of LFAA countermeasure alternatives in the SSN Security Program. Combined with related DARPA efforts in this area, the Navy would be able to decide on the most effective methods (target strength reductions, countermeasures, tactics, etc.) to counter the LFAA threat.

— Integrated Hull Coating: Multiple 6.2 and industry research efforts in target strength, radiated noise, shock, and non-acoustic signature reductions would be combined to develop a prototype integrated hull coating and conduct testing.

— Composite Fairwater & Control Surfaces: Composite material technology in industry is ready for application to external submarine structures, offering the benefits of reduced weight, lower target strength and signatures, and elimination of corrosion. This effort would design, build, test, and create the design standards for composite fairwater and control surfaces.

— Quiet weapons and countermeasures (CM) launchers: Continued evaluation and testing of one or more quiet weapon and CM launcher technologies. Further, the ship-to-vehicle dynamic interactions and communication links can be researched to define launcher requirements for weapons or vehicles which exit the submarines slowly.

— Auxiliary Systems: Development and qualification testing of promising technological solutions to reducing auxiliary systems production and maintenance costs without compromising exacting submarine performance standards. Navy representatives could procure new technology components from industry or transition DARPA and 6.2 test systems for laboratory or at-sea testing. Candidate systems include:

— Integrated Acoustic/Shock Equipment Mounts
— Electromagnetic Actuators
— Reverse Osmosis Distilling
— Lightweight, Shock Qualified Hatches

QUESTIONS SUBMITTED BY SENATOR WILLIAM S. COHEN

Senator COHEN. Admiral Jones, the Navy has designated the U.S.S. *Memphis* as its R&D Submarine, which will be used for testing various devices at sea. What can you tell us about the status of this program?

Admiral JONES. In 1988, the Chief of Naval Operations established the R&D Submarine Program to provide a dedicated SSN-688 class submarine for the support of submarine research and development. The action was taken to stimulate the development of technologies to support advanced submarine concepts and provide a rapid prototyping mechanism to speed their introduction into the fleet. Use of the platform is open to both government and non-government entities having legitimate needs to evaluate equipment and concepts in an at-sea, submarine environment.

U.S.S. *Memphis* (SSN-691) has been supporting R&D project test and demonstrations since August 1989. R&D project support is concurrent to the planning for the ship's overhaul modifications which will further enhance the platform's capability to accommodate R&D. The following is a summary of project utilization to date:

73 projects requiring submarine support have been submitted
8 have been completed
9 are currently in progress
10 are planned for installation within a year
19 were recently approved
2 have been disapproved
7 are under review
6 are currently inactive due to funding
12 have been canceled because testing is no longer required

New projects are solicited on a quarterly basis and 12 months in advance of the test quarter.

After appropriate design and planning, *Memphis* will undergo modification during a currently scheduled overhaul to commence in fiscal year 1994. The modifications will be designed to enhance the ship's capability to support the broad range of technology developments envisioned for test and evaluation, including those requiring internal and external configuration changes, and will provide greater flexibility to accommodate R&D projects for the duration of the ship's service life.

We are currently in the detailed design phase of the modification planning and have begun long lead time material procurement and prefabrication.

Senator COHEN. What is its relation to the smaller, non-nuclear *Dolphin* submarine?

Admiral JONES. *Dolphin* is a deep submergence research vessel that has been used to test R&D projects. However, its sonar suite is limited to an obstacle avoidance system and has no sensors capable of acoustically monitoring installed projects. Furthermore, *Dolphin* is limited in speed and has no torpedo tubes or weapons control system. Although testing aboard *Dolphin* could provide useful submarine related information, testing aboard *Memphis* will allow early evaluation in an operational environment.

Senator COHEN. Is the *Memphis* adequate for accomplishing all your at-sea testing, or could you use additional test assets?

Admiral JONES. *Memphis* will undergo modification during a currently scheduled overhaul commencing in fiscal year 1994. The modifications will be designed to enhance the ship's capability to support the broad range of technology developments envisioned for test and evaluation, including those requiring internal and external configuration changes, and will provide flexibility to accommodate R&D projects for the duration of the ship's service life. Alternate platforms will be used on a case basis when *Memphis* cannot meet project requirements.

Senator COHEN. Is it essential that an R&D submarine be nuclear powered?

Admiral JONES. The R&D Submarine Program is intended to provide a rapid prototype mechanism to speed the introduction of advanced submarine concepts and technologies into the fleet. The Navy has selected a platform that will meet the requirements and objectives of the R&D Submarine Program. Although nuclear power may not be essential from an individual project standpoint, it is essential that the test vehicle closely match current fleet assets to support the rapid prototyping philosophy.

Senator COHEN. As a related matter, what are you using for targets to simulate non-nuclear submarines in exercises?

Admiral JONES. In most cases, nuclear submarines are used in exercises to simulate nonnuclear submarines. However, diesel-electric submarines from allied countries sometimes participate and provide target services during exercises.

Senator COHEN. Secretary Cann, what does the Navy intend to do with the electromagnetic countermeasure launcher projects?

Mr. CANN. The Navy intends to evaluate the electromagnetic countermeasure launcher with the goal of achieving the required quieting. This evaluation will assess whether adequate quieting can be reached and will be conducted in fiscal year 1991 and fiscal year 1992. When this evaluation is completed the Navy will conduct at sea testing if appropriate.

NON-ACOUSTIC ASW

Senator COHEN. What is the current organization for funding research into non-acoustic ASW? How do you think funds should be allocated for non-acoustic ASW between the Navy and other DOD activities, and what do you think should be the management structure?

Mr. CANN. In fiscal years 1990 and 1991, Congress appropriated funds to OSD for execution of a Non-Acoustic ASW (NAASW) advanced development (6.3 level) program. These funds were subsequently disbursed to a variety of government and industrial program participants including Navy, DARPA, Department of Energy laboratories, and numerous contractors including Norden, Grumman, Kaman, Lockheed-Sanders, General Electric and SAIC to list a few. In addition to the funding provided by OSD, Congress appropriated additional 6.3 money in fiscal year 1991 specifically for Navy NAASW program execution. The Navy has also funded annual exploratory development (6.2 level) NAASW efforts from the ASW Technology Program Element. Currently, about 10 percent of the program element's funds are used for that purpose.

Consistent with the intent of the DMR, Navy, with DOD oversight, should be directly responsible for executing programs which resolve outstanding technical issues and transition to acquisition those systems which meet fleet needs. As the service responsible for the conduct of ASW, Navy is the organization best able to match

technological capabilities to ASW requirements. Because of its long involvement in NAASW, Navy also has the program management infrastructure and technical and management expertise to successfully execute these programs. Ultimately, any ASW development will have to be translated into a fleet system no matter where it originates, and the earlier in the process Navy becomes involved, the more successful that transition will be. Available funding should be allocated in the manner which best ensures early and comprehensive Navy involvement in promising NAASW technology development.

LABORATORY CONSOLIDATION

Senator COHEN. Secretary Cann, the Navy recently released a plan describing the Navy's goals for laboratory consolidation. What do you think should be the division of responsibility between the systems commands and the labs for program management?

Mr. CANN. Management of Navy programs is assigned to specifically designated Program Managers (PMs). Managers of major programs report directly to me, as the Navy Acquisition Executive, through Program Executive Officers (PEOs) and Direct Reporting Program Managers (DRPMs). The PEOs/DRPMs draw administrative and logistical support from the System Commands (SYSCOMs), but do not report through them. A number of smaller programs are managed by PMs in the SYSCOMs. In both cases, each PM has full authority to make investment decisions for his program, within the constraints of acquisition laws and procedures.

The Navy labs and centers are primarily performers of R&D and engineering support, not managers. However, in many cases, lab/center personnel assist PMs in identifying technical issues, establishing schedules and milestones, defining technical requirements, making technical tradeoffs, and monitoring technical performance. Navy labs/centers often "subcontract" some of their project funding to another lab, a commercial contractor, or to a non-profit organization. Under these circumstances, the lab/center could be considered to be managing a subset of the overall program. However, any such subcontracting is normally done only within the overall program guidelines provided by the PM. This link between the program manager in the Systems Command and the scientist/engineer in the laboratory is expected to be strengthened under the Navy consolidation plan, which aligns each of the new Warfare Centers under the SYSCOM from which it receives the majority of its work and funding.

Senator COHEN. What is the process whereby conflicts are resolved when a laboratory and a private company propose different solutions to a problem?

Mr. CANN. Within the context of applicable statutes and acquisition regulations, the PM in charge of each Navy program has the authority to select the best performer for a specific task. Selections are based on many factors, including technical merit, responsiveness to system requirements, affordability/total cost, and timing/scheduling considerations. In situations where a Navy lab/center and a private company propose different solutions to a problem, PMs can call upon independent third parties to aid in sorting out particularly complex, expensive issues and to supplement the capabilities of their immediate staff.

Senator COHEN. Secretary Cann, what responsibility do the labs have for maintaining expensive test facilities which are beyond the fiscal capability of private contractors to own? How do you determine whether private companies are granted timely access to use these test facilities?

Mr. CANN. There is no direct responsibility for the Navy to maintain facilities solely in support of contractor testing. The Navy does, however, make every reasonable effort to accommodate contractor requirements for government test facilities when such use would be advantageous to the government. Validated contractor requirements compete for services on the basis of program urgency and priority and appropriate user fees are charged for those services.

UPDATE IV AVIONICS

Senator COHEN. Secretary Cann, the Navy has requested funds for continued development of Update IV, which is a program to develop new mission avionics for the P-3C maritime patrol aircraft. But no funds have been allocated in the FYDP for procurement of this system. What are the Navy's plans for Update IV?

Mr. CANN. The Update IV system is currently in development. The Navy anticipates prototype delivery between July 1992 and July 1993. In the worst case, the Navy will have from July 1993 to March 1994 to perform DT/OT-IIA testing and conduct a MS-III decision in fiscal year 1994.

The Navy considers the Update IV system to be the future airborne ASW mission avionics suite for P-3C new or retrofit. However, uncertainties caused by developmental problems that have plagued this program prevented the Navy from including procurement funding in the FYDP. We will address the Update IV production issue in our fiscal year 1994 budget.

[Additional prepared statements for the hearing record follow:]

U.S. SENATE,
Washington, DC, June 7, 1991.

Hon. EDWARD M. KENNEDY
Chairman, Subcommittee on Projection Forces and Regional Defense,
Committee on Armed Services,
Washington, D.C.

DEAR MR. CHAIRMAN: I would be most appreciative if you would make the enclosed statement part of the record of your hearing on June 7 on the subject of anti-submarine warfare and attack submarine programs.

With all best wishes,

Ever sincerely,

CLAIBORNE PELL.

PREPARED STATEMENT BY SENATOR CLAIBORNE PELL

Mr. Chairman and members of the committee: I congratulate you for holding this hearing on anti-submarine warfare programs and the role of attack submarines. It is of utmost importance that we reach a clear understanding of what our future security needs are likely to be in this area and that we adjust our present policies accordingly.

This is a matter of critical importance to my State of Rhode Island. Probably no other State or region in the country has an industrial base so uniquely dedicated to ASW programs and activities, including the production of attack submarines.

One major focal point of this activity is the Naval Underwater Systems Center (NUSC) at Newport, presently the Navy's principal research center for submarine warfare and submarine weapons systems. The center, which presently employs over 2,000, is slated for reorganization with broader responsibilities and 1,000 more employees under proposals now pending before the Base Closure and Realignment Commission.

The mission of NUSC has spawned a broad-based private sector community of high technology contractors who have evolved to serve the Navy's special needs in the ASW area. Most of them are small businesses—some 60 of which are located in Newport County—but there is large corporate involvement as well. Most notable is the Raytheon Corporation's Submarine Signal Division at Portsmouth, R.I., which builds sonar equipment and submarine combat systems, employing some 2,000 people.

But the principal focal point of ASW activity in Rhode Island has to be the Quonset Point facility of the Electric Boat Division of General Dynamics, located on the site of a former Navy base on the west side of Narragansett Bay. The attack submarine production line starts here.

At Quonset Point, Electric Boat operates an Automated Frame and Cylinder Manufacturing Facility which is the only one of its kind in the world. This $287 million facility has the capability of fabricating sections of steel cylinders up to 42 feet in diameter which become the basic building blocks of a nuclear submarine hull.

This sectional construction process evolved with the construction of the 688 attack submarines and the Tridents, and it is being used to its fullest advantage in the *Seawolf* program. The process permits installation of prefabricated modules of machinery, piping and structural components into the open cylindrical sections before they are joined to form the submarine hull. Substantially improved productivity results since much complicated installation work does not have to be performed within the limited confines of the completed hull.

More than 4,000 Rhode Islanders work at this facility and the annual payroll is some $135 million. Another 3,000 residents of our State cross into Connecticut each day to work at Electric Boat's Groton facility, where the cylindrical sections are joined into completed submarine hulls. So all told, Electric Boat employs over 7,000 Rhode Islanders, making it the largest private sector employer of Rhode Island workers.

In addition to the total Electric Boat payroll of $248 million to Rhode Island workers at Quonset Point and Groton, Electric Boat does business with some 900 suppliers in the State and purchases goods and services amounting to $25 million annually. The Quonset Point facility generates State income taxes of $8.5 million and sales taxes of over $40 million. In a State as small as Rhode Island, such an enterprise is a giant presence indeed.

Transcending these important local considerations, there is a factor of urgency and importance for the national interest, and that is whether this unique manufacturing facility—located as it is at the heart of a regional complex of ASW activity—is to continue to operate or gradually fall into disuse. In this era of declining military spending, the loss of a major contract combined with fitful competition for minimal submarine production in the foreseeable future could well lead to a shutdown of the facility.

Unfortunately, we are witnessing at this time, in connection with the procurement of the second *Seawolf*, the inevitable consequence of trying to sustain too many producers for a very limited volume of work. In an unprecedented move, the losing bidder has succeeded in winning a court injunction to block work on the boat while the court considers the merits of the losing bidder's challenge of the contract. In my view, the challenge is without merit and never should have been brought. And it never would have been brought had the Navy moved more promptly to adjust its industrial base policy to the realities of the time.

To my mind, logic leads inescapably to the conclusion that Electric Boat should be kept in business, and that it should be designated as the Navy's sole source for the foreseeable future. There are a host of powerful arguments to support this view, but common sense considerations alone are persuasive. Unlike its principal competitor, Electric Boat is dedicated exclusively to submarine production. Its plant is state-of-the-art and its workforce is highly skilled and specially trained to operate a unique facility. And it is surrounded by an established community of research institutions and businesses on the cutting edge of undersea warfare technology.

In my view, it is in the national interest to preserve this unique defense industrial facility and to provide reasonable assurance of procurement continuity.

Hopefully, your hearing today and subsequent deliberations will result in a clearer definition of future requirements in the ASW and attack submarine field and the Navy will adjust its industrial base policy accordingly. Again, I commend you for bringing us a step closer to such a resolution.

[Whereupon, at 11:06 p.m., the subcommittee recessed, to reconvene upon the call of the Chair.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEARS 1992 AND 1993

FRIDAY, JUNE 14, 1991

U.S. SENATE,
SUBCOMMITTEE ON PROJECTION FORCES
AND REGIONAL DEFENSE,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

NAVAL FORCES ISSUES

The subcommittee met, pursuant to notice, at 9:38 a.m., in room SR-222, Russell Senate Office Building, Senator Edward M. Kennedy (chairman of the subcommittee) presiding.

Committee members present: Senators Kennedy, Cohen, and Mack.

Committee staff members present: Arnold L. Punaro, staff director.

Professional staff members present: Creighton Greene and Michael J. McCord.

Minority staff members present: Patrick A. Tucker, minority staff director and counsel; and Mark B. Robinson, professional staff member.

Staff assistant present: Julie W. Kemp.

Committee members' assistants present: William J. Lynn, assistant to Senator Kennedy; Andrew W. Johnson, assistant to Senator Exon; Charles C. Smith, assistant to Senator Dixon; Samuel D. Adcock, assistant to Senator Lott; and Ross Lindholm, assistant to Senator Mack.

OPENING STATEMENT OF SENATOR EDWARD M. KENNEDY, CHAIRMAN

Senator KENNEDY. We will come to order. The subcommittee meets this morning to consider the Navy's plans for moving into the future in a radically different world with a greatly reduced threat from the one faced during the Cold War. The Warsaw Pact threat has evaporated. The warning time for major East-West conflict has increased from weeks, months, or to years. As it has in other hearings this year, the subcommittee will consider where the Navy is headed in light of these circumstances.

The challenge facing the Navy in this era of major budget deficits is to develop a plan for its future role in our National Military Strategy, and to identify the programs and budgets needed to im-

plement that strategy. The Navy will have to design and build more affordable ships, aircraft and systems. The Navy will clearly have to be efficient on costs, but it will also have to be sensible about the relative emphasis placed on various missions and war fighting capabilities.

The subcommittee will hear this morning from two groups of witnesses. First, the Congressional Budget Office will discuss where the Navy ship force structure is headed over the next 20 years to 30 years. This perspective will provide a useful framework for the subcommittee to consider the 1992–1993 programs and its implications for the future.

The second panel of witnesses from the Navy will describe how the Administration's naval program supports the National Military Strategy. They will also give their perspective on how the Navy should respond to the challenges presented by the new world order.

Our first witness is Robert Hale, assistant Director for the National Security Division, Congressional Budget Office. Mr. Hale, we look forward to your testimony. Next we will have with us the Honorable Lawrence Garrett, Secretary of the Navy, and Admiral Frank Kelso, Chief of Naval Operations. I extend a warm welcome from the subcommittee to each of you and look forward to each of your statements. Senator Cohen.

Senator COHEN. Thank you, Mr. Chairman. Let me join you in welcoming all of our witnesses and say that I had a chance to read the article, "The Way Ahead," which was published in the Naval Institute Proceedings, and frankly I have tried to assimilate the information in the article in a very short period of time into some coherent themes for today.

It seems to me we've at least three important questions to ask. Number one, what do we want the Navy to do? In the past, it has been relatively easy to identify its mission, namely, deploying our nuclear attack submarines to defend sea lanes and provide nuclear deterrence, and deploying the carrier battle groups on a regular, recurring basis to various parts of the world, to be available for any kind of quick response. But that structure is now being re-examined, is being forced to be re-examined by virtue of the fact that the Soviet threat appears to be diminishing, at least as it pertains to Europe.

As Senator Kennedy has indicated, we are facing a serious reduction in budgets, some 25 percent. There are a lot of important functions that the Navy has to carry out, but identifying them and articulating them in a very coherent and persuasive fashion is going to be a task that is going to be tough to measure up to.

The second question is what are the resources available and are they sufficient to sustain and modernize the planned forces. Here we are going to get into a question of cost and management. How good has our cost estimating and forecasting been, and how does that track with what it has actually cost the Navy to produce those particular systems? What management actions have been taken when differences develop? And then, of course, what are the planned resources going to be, and what will be appropriated?

The third question is, what are we going to do to reduce the high cost of doing business? It seems to me that this is the area of attention that we ought to be addressing today. What are the options

going to be for reducing the costs of operating, the costs of developing and acquiring new weapons systems? What should the balance be between in-house laboratories and private industry for the development of these new capabilities?

Mr. Chairman, if I could summarize, for Admiral Kelso and Secretary Garrett, the list of challenges is quite lengthy, but just let me list them quickly: controlling and reducing costs in ship building; developing an affordable, effective plan for naval aviation; closing bases and reducing support for infrastructure ashore; here is something that Senator Kennedy and I are very much involved with in a variety of ways—maintaining an industrial base while maintaining competition if at all possible; adjusting to changes in the relative centralization and decentralization of decision-making power; fighting something that does not appear here in this committee, special interests on Capitol Hill; and developing capabilities that deal with the threats from mines and new anti-ship missiles.

These are just some of the challenges that the Navy has to address. I am hoping we will have a chance to get some responses from the witnesses following Mr. Hale's presentation.

Senator KENNEDY. Very fine. Thank you. Mr. Hale, we will be glad to hear from you.

STATEMENT OF ROBERT F. HALE, ASSISTANT DIRECTOR, NATIONAL SECURITY DIVISION, CONGRESSIONAL BUDGET OFFICE ACCOMPANIED BY LANE PIERROT, PRINCIPAL ANALYST, NATIONAL SECURITY DIVISION, CONGRESSIONAL BUDGET OFFICE; AND MICHAEL B. BERGER, NAVY ANALYST, NATIONAL SECURITY DIVISION, CONGRESSIONAL BUDGET OFFICE

Mr. HALE. Thank you very much, Mr. Chairman. I appreciate the opportunity to testify. I have with me Lane Pierrot and Michael Berger, who prepared our testimony. And I would also like to thank Bill Myers and Ray Hall for their cost analysis on this. I will submit a prepared statement with your permission, Mr. Chairman, and provide a summary of our results.

There is, of course, great uncertainty about the nature of future threats to U.S. security and about available funds to the Navy, as you have both pointed out in your opening statements. In the face of these uncertainties, I will discuss today a wide range of possible naval forces, focusing on their long-term costs.

Let me start with just a brief summary of our key findings. Between 1991 and 1995, the Navy's total budget will decline in real terms under the administration plan, but after that, increases of between about 1 percent and 3 percent a year will be required between 1995 and the year 2010 to maintain the administration's planned naval forces. The wide range of cost increases really reflects mostly an uncertainty about the future costs of weapons, which have already been highlighted in the opening statements.

This annual growth could leave the real level of the Navy's total budget $55 billion higher in the year 2010 than the planned level for 1995. The real growth may seem small, but the dollar effects are large.

Now, if Navy budgets do not grow, but are constant in real terms, the service could be forced to shrink its fleet to about 310 ships and about 9 carriers, certainly a far cry from the goal of 600 ships and 15 carriers that the Navy was pursuing just a few years ago.

Having summarized our key findings, let me turn to a more detailed analysis of the administration's plan. As I think you know, the administration ordered the Navy to cut its battle force ships to 451 by 1995, with a total of 12 carriers. That would include the carriers undergoing service-life extension or nuclear refueling. Beyond 1995, complete details about the administration plan are not publicly available, but the Navy has discussed plans for many of its forces. They have said, for example, that they want to maintain a total of 12 carriers, 13 air wings, 80 attack submarines, and a variety of other types of ships.

Taken together, these statements imply that the size of the administration's planned Navy would continue to decline beyond 1995, perhaps falling to a level of 415 ships by the year 2010, largely because it does not appear that they will replace certain types of vessels on a one-for-one basis. The decline in the number of ships under the administration plan, and particularly the reduction in number of aircraft carriers, could lengthen the time required to respond to international crises because there would be fewer ships deployed overseas. The smaller fleet would have less capability in wartime as well.

This reduction would be most worrisome, presumably, in a major war with the Soviet Union. But in lesser and probably more likely conflicts, the administration's planned Navy may well be adequate. Measures of Navy firepower are also reassuring because they actually suggest an increase in capability, even as the number of ships declines. For example, the Navy's primary fleet of surface ships seems likely to decline in number by about 20 percent between 1991 and 2010 under the administration's plan. But the missile-carrying capacity of this fleet would increase by about 25 percent over this same period because the newer ships carry many more missiles than the ones they will replace. A similar trend would occur in the number of weapons carried aboard attack submarines, and might occur in the number of carrier air wings.

In addition to affecting capability, the administration's naval plans would have an important effect on the Navy's future budgets. Because ships and aircraft take years to build and remain in the fleet for years, we have estimated the cost of the Navy over a long period of time; to the year 2010. To take into account important uncertainties about these long-run estimates, we made two kinds of assumptions. The lower ones make optimistic assumptions that might materialize if the Navy is successful in holding down weapons cost. For example, the lower estimates assume no growth in the cost of new weapons above their planned level. They also assume that future submarines and surface combatants are about one-third cheaper than those that the Navy is deploying today.

The lower estimates also assume that selected categories of cost, such as research and development, stay constant at their planned 1997 level in real terms, rather than growing along with the Navy's total budget.

CBO also estimated higher costs under assumptions that are more consistent with past experience. Those higher estimates assume growth above planned levels in the cost of new weapons and proportional increases in costs such as R&D.

What does this range of estimates tell us? Between 1991 and the year 2010, the estimates suggest that the administration's planned Navy would result in a roughly constant budget under the lower estimates, but that increase would average about 2.1 percent a year under the higher estimates. You can see these figures in the left-most column of my cost-increase chart. All the numbers that I am going to be using today are based on constant dollars of budget authority.

There are markedly different trends in interim periods between 1991 and the year 2010. Between 1991 and 1995, under both lower and higher estimates, the budget would decline as the administration plans. Most of that reduction occurs because we are going to have fewer ships, and hence, smaller operating budgets. Between 1995 and 2010, however, the forces of the administration's plan would require substantial budgetary increases. They would average 0.8 percent a year under the lower estimates, and as much as 3.4 percent a year under the higher estimates.

The percentage of growth may sound small, but as I said earlier, they have important effects on dollars. By the year 2010, we are talking about a Navy budget to maintain the administration's plan that is higher by between $11 billion and $55 billion than its planned level in 1995.

The growth in the years beyond 1995 occurs because we are buying new ships and aircraft that will be costly. The rapid growth reflects plans to buy the AX attack aircraft, the E/F version of the F/A-18 aircraft. By the middle and latter part of the next decade, when Navy budgets could grow especially rapidly, the service will probably also have to buy several additional types of planes as successors to the S-3, the AV-8B, and the F/A-18. Large purchases of aircraft suggest that few, if any, dollars would be available to shift from aircraft to ships, but between 1996 and 2010, the Navy will also have to buy a number of aircraft carriers and three attack submarines a year if they are going to maintain a fleet of 80 submarines.

In the middle or latter part of the next decade, the Navy will have to buy additional surface combatants and a new generation of ballistic missile submarines.

It is possible that Naval budgets will grow by the 1 percent to 3 percent a year that would be required beyond 1995 to achieve the administration's plans. But it is also plausible to assume that rather than increasing after 1995, the Navy's total budget might stay constant or even decline. In that case, the Congress and the administration will have to consider alternatives that lower the cost of naval forces.

My prepared statement discusses in detail two options that reduce costs. They vary according to the emphasis placed on naval missions. The first one would reduce emphasis on sea control by, among other changes, reducing the fleet of U.S. attack submarines from its eventual level of 80 ships under the administration plan to 45. The second option would reduce emphasis on power projection

by cutting the total number of aircraft carriers from 12 to 10 and making associated changes in the number of escort ships.

Compared to the administration plan, both these options would reduce U.S. naval capability. The Navy would be able to maintain fewer submarine patrols and deploy fewer carriers in peacetime, and would have fewer forces to mass in time of war. Both options would, however, leave the United States with a significant naval force. By 2010, under these options, the United States would have a fleet numbering about 380 to 385 ships, compared with 415 under the administration plan. You can see this on my chart in bar graph form on the right four columns.

Both options would also reduce the cost of naval forces. The cost reductions would be relatively modest, and neither approach would eliminate the need for growth in the total Navy budget beyond 1995. If you are interested in the specific results, they are in the middle two columns on my cost growth chart.

What happens if budgetary growth does not materialize beyond 1995? What if, for example, the Navy's total budget remains constant in real terms after 1995? To illustrate one of the many feasible approaches to accommodating a constant total budget, option three in my testimony assumes a decrease in forces for both sea control and power projection. Specifically, the option reduces the number of attack submarines to 45 and the number of aircraft carriers to nine. In addition, the option assumes reductions in surface combatants beyond those associated with the reduction in carriers. That would imply a cut in the number of ships that escort a typical carrier from about six to five.

Finally, under this option, naval aviation would pursue what might be called a silver bullet approach. That would mean buying fewer of the most capable planes, presumably the AX, and more aircraft with relatively less capability, perhaps today's version of the F/A-18. The small number of highly capable aircraft would be used to attack the most heavily defended targets. The total size of this fleet under this constant budget approach would fall to 310 ships by the year 2010. You can see that in the right-most column of the bar chart. This option would reduce the capability of the Navy, both to project power overseas and to conduct sea control. In some cases, especially for power projection, the reductions would be even greater than I discussed earlier, because we would be going to 9, rather than 10 carriers.

Nevertheless, the Navy, as proposed under this option, would still have substantial capability. The ship count understates the capability of this smaller Navy because many of the ships in the future fleet would be more capable than today's versions.

Moreover, if the Navy is successful in holding down the future costs of weapons, this 310-ship Navy would fit within a budget that was roughly constant in the years beyond 1995. Growth in procurement of ships and aircraft would still occur, but it would be offset by declines in the operating budget associated with the reduction to 310 ships.

Unfortunately, using costing assumptions that are more consistent with past experience, and so assuming some growth in costs, the Navy's budget would still grow after 1995, even as the service shrinks to 310 ships. To me, this emphasizes the critical impor-

tance of designing less expensive weapons. Otherwise, the Navy may well shrink to a level substantially below 300 ships in the next decade.

In summary, Mr. Chairman, it is clear that future budgetary limits could have important effects on the Navy of the next decade. Even though we are talking about bills that will not all come due for more than 10 years, the debate about what kind of Navy the United States needs and can afford should begin now. The decisions that you are going to make over the next few years will shape your future choices. Among those decisions are whether and how quickly to design and field the AX aircraft, whether to upgrade capability and increase the cost of the F/A-18 aircraft, and, perhaps particularly important for this subcommittee, the nature and cost of the successors to the SSN-21 submarine and the DDG-51.

Moreover, the debate over the long-term future of the Navy is important to the U.S. defense budget, and certainly to the security of the United States, and it would be preferable to begin that debate today, while there is time to deliberate, rather than waiting until budgetary pressures demand a quick answer.

That concludes my oral statement. We would all be glad to answer your questions.

[The prepared statement of Mr. Hale follows:]

PREPARED STATEMENT OF ROBERT F. HALE, ASSISTANT DIRECTOR, NATIONAL SECURITY DIVISION, CONGRESSIONAL BUDGET OFFICE

I appreciate the opportunity to testify today about the Navy's budgetary requirements, particularly its long-term requirements. There is, of course, great uncertainty about the nature of future threats to U.S. security, and hence about the size and nature of the Navy that this country will require. There is also great uncertainty about how much money will be available to buy and operate Navy ships and aircraft, particularly in the years beyond 1995.

In the face of these major uncertainties, this testimony considers a wide range of possible naval forces, including the administration's planned forces as well as alternatives that vary in their emphasis on key Navy missions. The testimony concentrates on the issue of long-term affordability, though it also discusses the effectiveness of alternative naval forces. Ships are the focus of the discussion, but the testimony also considers naval aviation.

CBO's analysis reaches several broad conclusions:

- Though the Navy's real budget levels would decline through 1995 under the administration plan, in the 15 years after 1995 budgets would have to increase by between about 1 percent and 3 percent a year to maintain the administration's planned forces, leaving the total budget in 2010 higher by between $11 billion and $55 billion than in 1995;
- The wide range of cost increases primarily reflects uncertainty about the future cost of weapons, with the higher estimates being most consistent with past experience; and
- If Navy budgets beyond 1995 were kept constant in real terms, the service might be forced to reduce its fleet from the planned 1995 level of about 450 ships to no more than 310 ships (including 9 aircraft carriers) and to equip the carriers with only a small number of the most capable aircraft.

THE ADMINISTRATION'S PLANNED FORCES

Under the administration plan, the Navy would have fewer ships and aircraft in future years than it has today, a trend that would affect both budgets and capability.

DESCRIPTION OF THE FORCES

By 1995, the Navy would have 451 battle force ships under the administration plan, about 15 percent fewer than it had at the end of 1991 (see table 1 and figure 1). The total number of aircraft carriers—including carriers that would be undergoing a service life extension or nuclear refueling and therefore would not be available on short notice—would decline from 15 in 1991 to 12 in 1995, while the air wings associated with the carriers would fall from 14 (down from 15 in 1990) to 13. The 1995 fleet would include about 90 attack submarines.

Beyond 1995, complete details about the administration's plan for the Navy are not publicly available. The Navy has, however, discussed plans for its most important forces. For example, the Navy has said that it seeks to maintain 12 aircraft carriers, 13 air wings, 80 attack submarines, 18 submarines that carry strategic ballistic missiles, 150 surface combatants (cruisers, destroyers, and frigates), and enough amphibious warfare ships to transport the personnel and equipment associated with two and one-half Marine Expeditionary Brigades (about 34,000 Marines). CBO assumes that other naval forces would be maintained in numbers consistent with these planned forces or with the Navy's most recently stated plans.

TABLE 1. NUMBERS OF SHIPS AND AIR WINGS UNDER VARIOUS OPTIONS

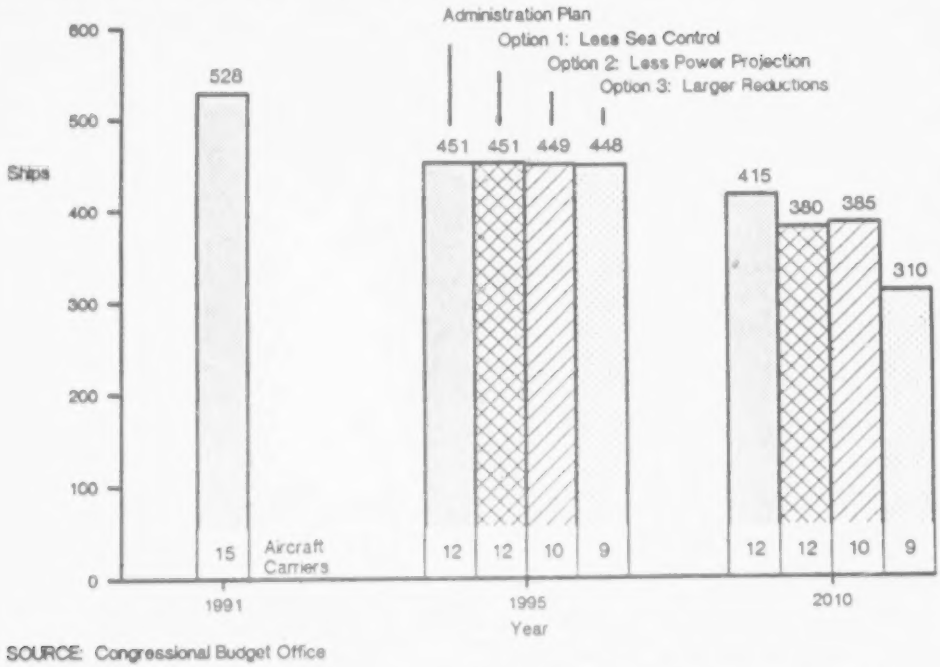
End of Fiscal Year	Type of Force	Options			
		Administration Forces[a]	I Less Sea Control	II Less Power Projection	III Larger Reductions
1991	Total Ships	528	528	528	528
	Aircraft Carriers[b]	15	15	15	15
	Air Wings	14	14	14	14
	Attack Submarines	87	87	87	87
1995	Total Ships	451	451	449	448
	Aircraft Carriers[b]	12	12	10	9
	Air Wings	13	13	11	10
	Attack Submarines	90	90	90	90
2010	Total Ships	415	380	385	310
	Aircraft Carriers[b]	12	12	10	9
	Air Wings	13	13	11	10
	Attack Submarines	80	45	80	45

SOURCE: Congressional Budget Office.

a. For 1991 and 1995, CBO used Administration force levels. For 2010, CBO assumed forces that, combined with projected retirements and other assumptions, would maintain 12 aircraft carriers, 80 attack submarines, 150 surface combatants, 18 strategic ballistic missile submarines, 13 carrier air wings, 4 Marine Corps air wings, and the Administration's forces of land-based maritime patrol aircraft.

b. Total number of aircraft carriers, including carriers that are undergoing a service life extension or nuclear refueling. Carriers undergoing a service life extension or nuclear refueling would be disassembled to such a degree that they could deploy only after many months of preparation. Between zero and three carriers would be undergoing a service life extension or nuclear refueling at any one time.

Figure 1.
Numbers of Ships Under Options



SOURCE: Congressional Budget Office

These statements suggest that the total size of the administration's planned Navy would continue to decline in the years beyond 1995, perhaps falling to a level of about 415 ships by 2010. The decline would occur because some new types of vessels—such as ballistic missile submarines, destroyers, and some amphibious vessels—would not replace older ships on a one-for-one basis.

To support this fleet, the Navy plans to buy an average of 8.8 ships and 110 combat aircraft a year between 1992 and 1995. Between 1996 and the end of the next decade, the Navy would have to buy an annual average of 10.6 ships and 167 combat aircraft to maintain the administration's planned forces. These annual buys are determined by the desired size of naval forces and by planned retirements. (Tables A-1 and A-2 in the appendix to this testimony present more information about weapons purchases and retirement ages.)

One aspect of the administration's plan remains unclear, even for the years between 1992 and 1995. The administration has indicated that, because of needs that became apparent during Operation Desert Storm, it is considering increasing its capability to transport military weapons and supplies to crisis areas and its pre-positioning of weapons and supplies near areas of likely conflicts. However, the administration has not yet submitted a detailed plan for buying more sealift or pre-positioning capability. After that plan has been submitted and approved, there could be increases in the costs of the sealift portions of the administration plan. These added costs may be offset by reductions in other parts of the Navy's budget, and in any event they are unlikely to alter significantly the budgetary trends discussed in this testimony. [1]

FLEET CAPABILITY

The decline in the numbers of ships and aircraft under the administration plan suggests a reduction in naval capability, but trends in numbers of weapons and other measures tell a different story.

---

[1] For further discussion of sealift costs, see the statement of Robert Reischauer before the Committee on the Budget, U.S. House of Representatives, February 27, 1991, p.16.

Decline in Numbers of Ships. The decline in numbers of ships under the administration plan, and particularly the reduction in aircraft carriers, could lengthen the time required to respond to international crises. The decline under the administration's plan from 15 carriers in 1991 to 12 carriers in 1995 would probably reduce the average number of carriers deployed overseas in peacetime. If a crisis occurred somewhere in the world with little notice, and enough carriers were not already deployed overseas to handle the problem, there would be a significant delay before naval forces could be available. It takes a carrier based on the east coast of the United States about 15 days to reach the Persian Gulf. Several additional weeks could be required if the east coast carrier was not ready to sail. Delays would probably be shorter but still significant if the crisis occurred somewhere other than the Persian Gulf.

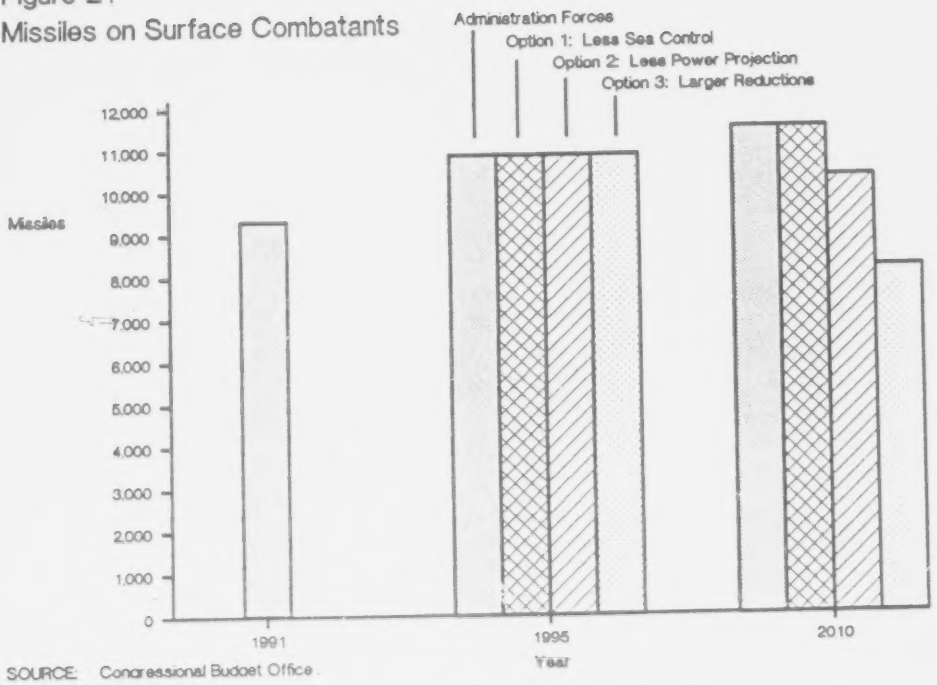
With fewer ships, the administration's planned fleet would also have less capability in a major war. This reduction in capability would be most worrisome in a war involving the Soviet Union, which has the ships and personnel to mount a major naval attack.

On the other hand, recent political events have greatly reduced the chance of a major war with the Soviet Union. Such conflicts seem much more likely. At least for lesser conflicts of the sort that have occurred since World War II, a Navy of between 400 ships and 450 ships and 12 aircraft carriers would probably be adequate to carry out U.S. policy. For example, the Navy deployed as many as six aircraft carriers and a total of about 100 ships to the Persian Gulf and surrounding seas during Operation Desert Storm. The smaller fleet planned by the administration could probably have sustained that deployment, though very likely with a good deal of strain and perhaps only for a limited period of time.

Measures Suggesting Increased Capability. Numbers of ships are an important measure of the ability of the Navy to meet crises and to mass forces in the event of war. But other measures are a better guide to sea-based firepower, and some of these measures actually suggest that the administration's planned forces would result in an increase in naval capability.

The Navy's primary fleet of surface ships (cruisers, destroyers, and frigates) seems likely to decline in number by about 20 percent between 1991 and the year 2010. Nevertheless, the missile-carrying capacity of this fleet would increase by about 25 percent over the same period because newer ships carry many more missiles than the older ships that they will replace (see figure 2). For example, new DDG-51 guided missile destroyers carry 90 missiles, in contrast to the 40 or so missiles aboard the DDG-2 ships that they will replace. In addition to carrying more missiles, the newer surface ships are equipped with the Mark 41 Vertical Launch System that can store and fire several types of missiles. Thus, these new ships will permit more flexibility to tailor missile loads to the demands of a particular mission.

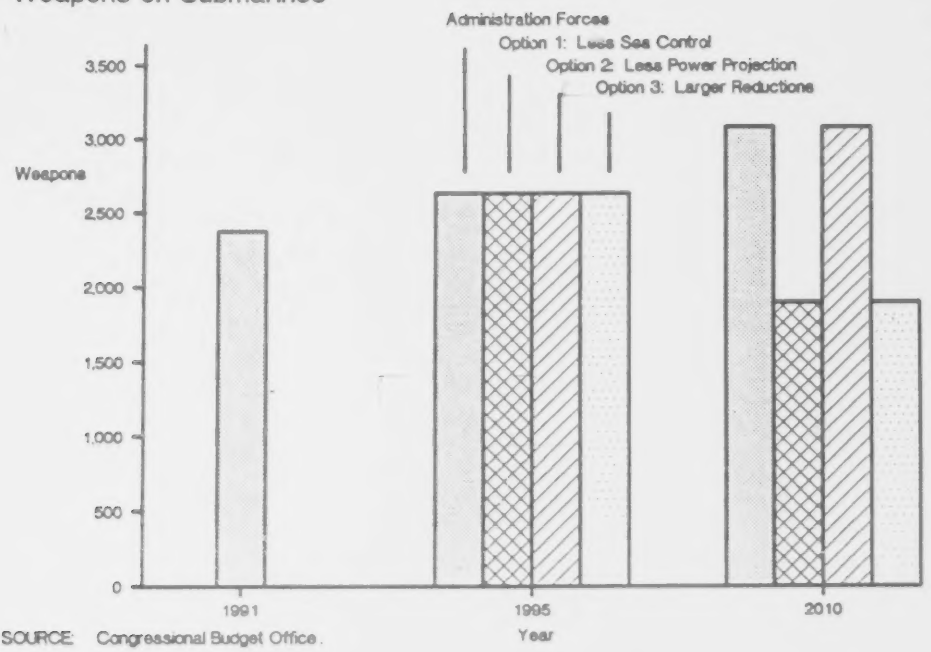
Figure 2.
Missiles on Surface Combatants



SOURCE: Congressional Budget Office.

Similar growth in capacity to carry weapons would occur on attack submarines under the administration plan. The number of ships would decline by 8 percent between 1991 and the year 2010. Yet the capacity of the submarine fleet to carry weapons would rise by about 30 percent (see figure 3).

Figure 3.
Weapons on Submarines



SOURCE: Congressional Budget Office.

An analogous trend may also occur in the capability of naval aircraft. Between 1991 and 2010, the number of air wings (each of which typically contains 80 to 90 planes) would decrease under the administration's plan from 14 wings to 13 wings. However, the administration also plans to develop and buy the AX attack aircraft, a new plane that will probably have increased range and advanced stealth characteristics. The Navy believes that stealth capability will greatly enhance the performance of the AX aircraft. The Chief of Naval Operations recently testified that non-stealth aircraft were lost to enemy attack at rates at least six times greater than those for stealth aircraft in computer simulations of possible future Middle East combat scenarios. Thus, while there would be fewer aircraft under the administration plan than there are today, the overall capability of the remaining planes might be greater.

EFFECTS ON COSTS

The administration's naval plans would also have important effects on future Navy budgets. It takes years to build Navy ships and aircraft, and they remain in the fleet for decades. Thus, in order to assess likely budget trends, CBO estimated the size of the Navy budget over a long period—from 1991 to the year 2010. The choice of the year 2010 as an end point is arbitrary. It represents a compromise between choosing an earlier year, which would not fully capture some important procurement programs that would be required to maintain the administration's planned forces, and a later year that would entail more speculation about future programs.

Lower and Higher Estimates. There are, of course, many uncertainties about the future costs of Navy programs, particularly about costs that would be incurred in the next decade. To reflect these important uncertainties, CBO made a lower estimate under optimistic assumptions that might materialize if the Navy takes far-reaching actions to hold down its costs, particularly the costs associated with new weapons. CBO also estimated higher costs that assume increases more consistent with past experience.

The lower-cost estimates rely on Navy estimates of the costs of buying new weapons; there is no allowance for cost growth above these estimated levels. Where Navy estimates for new weapons are not yet available, the lower estimates assume that

new weapons do not cost significantly more than earlier versions. Because the Navy has said that it will study the possibility of designing a new, cheaper attack submarine as a follow-on to the SSN-21 submarine, and a cheaper destroyer to follow the DDG-51, the lower estimate assumes that, beginning early in the next century, attack submarines and destroyers cost about one-third less than today's SSN-21 submarines and DDG-51 destroyers, respectively.

The higher estimates assume that costs grow above planned levels based on historical trends and the length of time that would elapse before the new system enters production. For example, ships are assumed to grow in cost by about 3 percent a year in real terms, consistent with past experience. Where Navy estimates for new weapons are not available, the higher-cost estimates are more consistent with historical experience, which suggests that new weapons tend to cost substantially more than the systems they replace. (See the appendix for more details about the assumptions.)

The lower-cost estimates also assume that categories of the Navy budget that cannot be related directly to ships and aircraft remain constant in real terms at their planned 1997 level. Historically, however, these categories of spending—which include research and development (RDT&E), procurement of Navy weapons (WPN) and other equipment (OPN), and Marine Corps weapon procurement (PMC)—have tended to rise in proportion to either procurement or total spending. The higher-cost estimates assume proportional increases (see appendix for details).

Cost Estimates. Between 1991 and the year 2010, the administration's planned forces would require increases in the Navy's total budget level that, after adjustment for inflation, average between 0.1 percent and 2.1 percent a year (see table 2). The budget in 2010 would exceed the 1991 budget level by about $1 billion to about $46 billion. The wide range of estimates reflects the effects of the cost growth assumptions under the lower and higher cost estimates. (Throughout this testimony, all costs are expressed in constant 1992 dollars of budget authority. Percentage changes are based on constant-dollar estimates of costs.)

TABLE 2. AVERAGE ANNUAL REAL GROWTH IN TOTAL NAVY BUDGET (In percent)

Time Period	Options			
	Administration Forces	I Less Sea Control	II Less Power Projection	III Larger Reductions
	Lower Estimate			
1991-2010	0.1	-0.2	-0.3	-1.0
1991-1995	-2.6	-2.9	-2.9	-4.4
1995-2010	0.8	0.5	0.4	-0.1
	Higher Estimate			
1991-2010	2.1	1.5	1.3	-0.4
1991-1995	-2.6	-2.9	-2.9	-4.4
1995-2010	3.4	2.7	2.5	0.7

SOURCE: Congressional Budget Office.

The pattern of real growth differs sharply during interim periods between 1991 and 2010. Between 1991 and 1995, the Navy budget declines by an average of about 2.6 percent a year under the administration plan, leaving the 1995 Navy budget about $9 billion lower than its budget in 1991. Most of the reduction occurs because the administration plan reduces the size of the Navy and, hence, its operating budget. This reduction is assumed to take place under both the lower and higher estimates of costs. The budget reduction is part of the cuts imposed by the Defense Department to meet the limits imposed by the Budget Enforcement Act of 1990.

In the years following 1995, the Navy's budget would have to increase. Between 1995 and 2010, the administration's planned forces would require budgetary increases averaging between 0.8 percent a year, under the lower estimate, and 3.4 percent a year, under the higher estimate. The budget in the year 2010 would be higher by between about $11 billion and $55 billion compared with the level planned for 1995. The most rapid growth would probably occur in the middle and latter part of the next decade.

The growth in the years beyond 1995 occurs because the number of ships and aircraft no longer declines while procurement funds grow sharply to pay for expensive new weapons. Between 1996 and 2010, procurement funding for ships and aircraft grows by an average of between 4 percent and 7.5 percent a year, depending on the assumptions about increases in future weapon costs (see table 3). This rapid growth reflects administration plans to purchase several new types of aircraft, including the AX attack aircraft and the new E/F version of the F/A-18 aircraft. Procurement funding also reflects the purchase of three new aircraft carriers and an average of about three attack submarines a year, which would be needed to maintain a fleet of 80 such vessels. Large purchases of aircraft will cause the Navy's aircraft

procurement account to add pressure to Navy budgets, rather than providing a source of funds for additional ship procurement.

TABLE 3. AVERAGE ANNUAL REAL GROWTH IN COSTS FOR NAVY PROCUREMENT OF SHIPS AND AIRCRAFT (In percent)

Time Period	Options			
	Administration Forces	I Less Sea Control	II Less Power Projection	III Larger Reductions
	Lower Estimate			
1991-2010	3.3	2.9	3.0	1.3
1991-1995	0.9	0.9	-0.9	-3.7
1995-2010	4.0	3.5	4.1	2.6
	Higher Estimate			
1991-2010	6.1	5.0	4.8	3.5
1991-1995	0.9	0.9	-0.9	-3.7
1995-2010	7.5	6.1	6.4	5.6

SOURCE: Congressional Budget Office.

By the middle and latter part of the next decade, the Navy's costs could grow especially rapidly as the Navy purchases several new types of aircraft as well as new classes of surface combatants and ballistic missile submarines, in addition to weapons systems such as attack submarines and the AX aircraft.

Budgetary growth could be slower if the Navy defers the purchase of some of the new classes of aircraft until after the year 2010. Last October, Adm. Richard Dunleavy, Assistant Chief of Naval Operations (Air Warfare), said the Navy planned to field several new aircraft in the first decade of the next century including: an Advanced Tactical Support Aircraft (which would replace the S-3A, E-2C, and EA-6 aircraft), a variant of the Air Force's advanced tactical fighter to replace F-14s, a successor aircraft to the F/A-18 and AV-8B, and the AX. But in May of this year Admiral Dunleavy testified that the Navy would defer some of these programs because of cost concerns. The exact nature of the Navy's new plan is unclear. The service may modify older aircraft instead of buying new aircraft, or it may simply decrease the number of planes in its air wings. The estimates in tables 2 and 3 assume purchases of replacements for the S-3A, E-2C, EA-6, F/A-18, and AV-8 aircraft. Deferring procurement would hold down costs. Should the Navy, for example, not buy any of the replacements for the S-3A, E-2C, and EA-6 aircraft or any variants of the Air Force's advanced tactical fighter, real growth in the Navy's budget from 1995 to 2010 would range from 0.5 percent to 2.5 percent a year compared with the estimates of 0.8 percent to 3.4 percent in table 2.

These reduced estimates may, however, understate likely future costs and so are not reflected in table 2. It will be difficult for the Navy to keep planes for the extended periods implied by these reduced estimates. For example, if the Navy does not buy any Advanced Tactical Support Aircraft (ATSA) until after the year 2010, then it will be operating some carrier-based S-3 aircraft (one of the planes to be replaced by the ATSA) until they are in their mid-thirties. If the service does not begin development of an ATSA until after 2010, it will have to retain S-3 aircraft until they are well over 40 years of age. Admiral Dunleavy, in his May testimony, expressed concern about keeping carrier-based aircraft in service beyond 30 years.

THE OUTLOOK FOR LONG-TERM BUDGETARY GROWTH

It is possible that naval budgets will grow enough to accommodate the administration's plans. The required growth is substantially less than the growth of 3 percent to 5 percent a year that was associated with plans in the mid-1980s for a 600-ship Navy.[2] Moreover, increases under the current administration plan would be consistent with past growth in U.S. gross national product (GNP). Long-term average GNP growth has amounted to about 2 percent to 3 percent a year, which would finance most of the administration's planned forces under the higher-cost assumptions. Even if the whole defense budget remained constant in real terms or grew at a rate less than long-term GNP growth, the administration and the Congress might decide to allocate a larger share of the total defense budget to the Navy. Finally, the administration may hope to pay for some growth in costs by achieving efficiencies in its operations, though in the past the Defense Department has had difficulty achieving large dollar reductions through efficiencies.

However, it is also plausible to assume that, rather than increasing after 1995, the defense budget could remain constant or decline further. Moreover, Operation Desert Storm emphasized the need for a wide variety of military forces, which may preclude substantial increases in the Navy's share of the total defense budget. Thus, the Congress and the administration may have to consider alternatives that would lower the cost of naval forces.

Option I. Less Emphasis on Sea Control

One approach to holding down costs would reduce emphasis on one of the Navy's principal missions—sea control. Sea control forces are designed to ensure that the United States can use the seas freely and safely in peace and war. Reducing emphasis on sea control would be consistent with the conclusion that a major war with the Soviet Union, the nation that could pose the greatest threat to U.S. ability to control the seas, is unlikely.

Enemy submarines are the greatest threat to sea control. Therefore, less emphasis on sea control means less emphasis on antisubmarine forces, which include U.S. attack submarines and antisubmarine aircraft. Specifically, this option would reduce the fleet of U.S. attack submarines from its eventual level of about 80 ships under the administration plan to about 45 ships (see table 1). The total size of the fleet would decline to 380 ships in 2010, compared with 415 ships under the administration plan. This option would also retire roughly one-half of the fixed-wing aircraft whose principal job is to find and destroy enemy submarines. These are P-3 land-based aircraft and S-3 carrier-based aircraft. Procurement plans would be reduced to be consistent with the smaller forces, but the Navy is assumed to continue to procure the advanced weapons systems now in development (see table A-1 in the appendix for more details about planned procurement).

ARGUMENTS FOR AND AGAINST LESS SEA CONTROL

Under this option, the U.S. fleet of attack submarines would be able to carry out fewer peacetime patrols. Also, in the event of a war, the United States would not be able to deploy as many submarines simultaneously as it could today, thus reducing wartime capability. The option would have comparable effects on aircraft designed to destroy enemy submarines. These reductions in U.S. antisubmarine capability would occur even though, according to testimony by the Navy, the Soviet Union continues to produce highly capable attack submarines in substantial numbers.

This reduction in U.S. capability may, however, be acceptable in a world where war with the Soviet Union seems unlikely. Few other countries have substantial submarine fleets. China has a substantial fleet of attack submarines (110 ships in-

---

[2] Congressional Budget Office, *Future Budget Requirements for the 600-Ship Navy* (September 1986).

cluding 4 nuclear-powered vessels). But the countries that seemingly represent the most plausible future opponents of the United States have much smaller fleets. North Korea, for example, has 22 attack submarines; Libya has six; Cuba has three. None of the ships in these countries' fleets is nuclear powered or as highly modern as the U.S. fleet.

Reductions in the size of the U.S. submarine fleet are also consistent with a continuation of the policies stated in a recent review by the Secretary of Defense. The Major Warship Review, released in August 1990, called for procurement of an average of one and one-half attack submarines a year between 1991 and 1994. The administration's budget plan for 1992 to 1997 further reduced procurement to a little more than one a year. If procurement levels return to those stated in the Major Warship Review and continue over a long period, the United States would eventually deploy a fleet of about 45 attack submarines.

EFFECTS ON COSTS

The reduction in sea control forces assumed under this option would modestly reduce the future costs of the Navy. But the Navy budget would still have to grow in the years beyond 1995.

Under the lower-cost assumptions, there would be a slight decline (averaging 0.2 percent a year) in the Navy's budget between 1991 and 2010, compared with a slight increase (averaging 0.1 percent a year) associated with the administration's planned forces (see table 2). An increase of about 1.5 percent a year would be required under the higher-cost assumptions, compared with the 2.1 percent a year that would be associated with the administration's planned forces.

Under this option there would also be shifts in the pattern of growth during interim periods. The decline in the Navy's budget between 1991 and 1995 would be slightly larger under this option (averaging 2.9 percent a year compared with 2.6 percent a year under the administration plan). The larger decline reflects the early retirement of older aircraft. Budgets would still have to grow beyond 1995 under this option, though by a smaller amount than the growth under the administration plan. Depending on the costing assumptions, average annual growth after 1995 would range from 0.5 percent to 2.7 percent a year, compared with the 0.8 percent to 3.4 percent a year that would be required under the administration's plan. The smaller long-term growth occurs primarily because of the need to buy fewer new attack submarines and submarine-hunting aircraft, but these reduced procurement needs are not enough to avoid the need for long-term growth in the Navy's budget.

Option II. Less Emphasis on Power Projection

An alternative approach to reducing the cost of naval forces would leave untouched those forces dedicated primarily to sea control and instead reduce aircraft carriers and associated forces that are designed primarily to project U.S. military power overseas. This option would be consistent with a willingness to accept a delay in the response of carrier forces to future international crises and, in the event of a war, to accept less carried-based capability.

Specifically, this option would reduce the number of aircraft carriers to 10 by 1995, compared with the 12 carriers under the administration's planned forces (see table 1). This option would also reduce the number of air wings that fly off carriers and the number of surface combatants. The total number of ships in the fleet would decline to 385 by the year 2010. The Navy is assumed to continue to buy the same types of weapons it now plans to purchase but in smaller numbers that would reflect the reduced size of the fleet (see table A-1 in the appendix).

ARGUMENTS FOR AND AGAINST LESS POWER PROJECTION

Under this option, the United States would have fewer carrier-based forces in the event of a major war, which would reduce U.S. capability to mass its forces quickly. For example, with only ten carriers, the Navy would have had more difficulty deploying six carriers during Operation Desert Storm and would have had fewer carriers available to meet other military contingencies.

The reduction in carriers might also slow the response of carrier-based forces in the event of an international crisis. With ten carriers, about three would typically be deployed overseas in peacetime. If more than three carriers were needed overseas, or if one was needed in a location far from its area of patrol, carriers based in the United States would have to prepare to leave port and travel to the location of the crisis. That could require several weeks or more.

Nevertheless, under this option the United States would have a substantial fleet of aircraft carriers, by far the largest fleet in the world. This fleet might be of acceptable size, particularly in a period when the chance of war with the Soviet Union seems low. Indeed, a fleet of between 10 and 12 aircraft carriers has been recommended by the chairman of the Senate Committee on Armed Services.

EFFECTS ON COSTS

Compared with the option that reduces emphasis on sea control, this one would save more money. But this approach would still not eliminate the need for post-1995 increases in the Navy's budget, even under the lower-cost assumptions.

Between 1991 and 2010, the Navy's budget under this option could fall by about 0.3 percent a year or grow by 1.3 percent a year, depending on the costing assumptions (see table 2). As with previous options, declines would occur through 1995, and the declines would be larger than under the administration plan. Beyond 1995, however, the Navy's budget would still have to increase by between 0.4 percent and 2.5 percent a year in order to pay for the 10 aircraft carriers and the other ships maintained under this option.

As under the previous options, the growth in costs beyond 1995 would be fueled primarily by the costs of procuring ships and aircraft, which would grow much faster than the overall budget (see table 3). The most rapid growth in costs would be likely to occur in the middle or latter part of the next decade.

Option III. Larger Reductions in Naval Forces

Even under the lower-cost assumptions, neither of the first two options could be accommodated if the Navy's budget remained roughly constant in real terms beyond 1995. Yet it seems plausible that the Navy's budget might not grow in real terms after 1995. If the post-1995 budget remained constant in real terms, what sort of a Navy would fit?

There are, of course, many answers to this question. To illustrate one feasible approach to accommodating a constant budget, Option III assumes a decrease in forces for both sea control and power projection. Like Option I, this one assumes that, by the year 2004, the Navy has a fleet of only 45 attack submarines and a reduced force of fixed-wing aircraft designed to hunt and destroy enemy submarines. This option also assumes a decline to nine aircraft carriers along with associated reductions in air wings and surface combatants.

In addition, this option assumes reductions in surface combatants beyond those associated with the reduction in aircraft carriers. These additional reductions imply a cut in the surface combatants that typically accompany an aircraft carrier from about six to five. In an environment where carriers are less likely to face Soviet bombers that can threaten them from long ranges, a smaller number of surface combatants may provide adequate defenses.

Finally, this option adopts a "silver-bullet" approach to fighter and attack aircraft. Under the administration plan, about one-third of the fighter and attack aircraft aboard aircraft carriers would eventually consist of the new AX attack plane, which would be designed to have advanced stealth characteristics. The remaining two-thirds of the fleet of fighter and attack aircraft would consist of relatively less costly and less capable planes.

In contrast, under the silver-bullet approach only about 10 percent of the fleet of fighter and attack aircraft would consist of the highly capable AX aircraft. This small fraction of highly capable aircraft—the silver bullets—would be used to attack the most highly defended targets. The other 90 percent of the fleet would eventually be equipped with relatively less capable fighters that are assumed to cost about as much as today's version of the F/A-18 aircraft. Thus, under this option, the Navy would not develop the improved E/F version of the F/A-18 plane, which would increase the capability but also the cost of the F/A-18 aircraft. [3]

Together, all the changes assumed under this option would lead to a Navy with about 310 ships. This fleet would include 9 aircraft carriers and 10 air wings of aircraft equipped under the silver-bullet concept.

ARGUMENTS FOR AND AGAINST LARGER REDUCTIONS

Many of the arguments cited in opposition to the first two alternatives would apply to this approach, sometimes to a greater degree because this option would

---

[3] For more discussion of this and other options for naval aircraft, see Testimony of Robert F. Hale before the Subcommittee on Defense, Senate Committee on Appropriations, May 8, 1991.

retain nine rather than ten carriers. In addition, the Navy might argue that the reduction in surface combatants surrounding each carrier would be unacceptable. Even if the threats from Soviet long-range aircraft decrease, the lower level of surface combatant vessels might leave the Navy unable to perform other missions, such as accompanying amphibious warfare ships or conducting operations that are independent of an aircraft carrier.

Also, the Navy would probably not support the silver-bullet approach that combines a few highly capable aircraft with a large number of relatively less capable planes. A less capable aircraft would not have adequate range and capability, in the Navy's view. Moreover, the number of well-defended targets in a future conflict might exceed the small number of highly capable aircraft that would be available under this silver-bullet approach.

Despite the arguments against this approach, the Navy proposed under this option would remain a substantial force. Ship counts alone understate capability under the option because many of the ships in the future fleet would be more capable than today's versions. For example, while the number of primary surface combatants and attack submarines under this option would both decline below today's level by about 50 percent, the number of weapons aboard these types of ships would decline by only 12 percent and 20 percent, respectively. The Navy would also retain the world's largest and most capable fleet of aircraft carriers. Thus, the smaller fleet envisioned under this option might be adequate to protect U.S. security interests, particularly if the major threats to U.S. security came from countries other than the Soviet Union.

EFFECTS ON COSTS

Moreover, if the Navy is successful at holding down the costs of weapons, this version of the Navy would fit within a budget that was roughly constant in the years beyond 1995. Under the lower-cost assumptions that assume little growth above planned levels in the unit costs of weapons, the Navy's budget would remain roughly constant at its 1995 level through the year 2010 (see table 2). Procurement costs for ships and aircraft would grow by a substantial amount, but the growth would be offset by declines in operating costs associated with the reduction to 310 ships (see table 3).

Under the higher-cost assumptions, however, the growth in procurement costs would not be fully offset, and the Navy's overall budget would grow by an average of 0.7 percent a year between 1995 and 2010. The budget in 2010 would exceed its level in 1995 by about $9 billion. Thus, if costs of weapons systems grow as they have tended to do in the past, the Navy might have to reduce its fleet below 310 ships in order to maintain a constant budget beyond 1995. Alternatively, the Navy could consider holding down costs by keeping ships in service longer than is now planned or by redesigning new vessels to be cheaper.

The larger reductions assumed under this option would also have important effects on the Navy budget between 1991 and 1995. In that period, the total budget would decline at a faster annual rate (about 4.4 percent) than it would under the administration plan (which results in an annual decline of 2.6 percent). Thus, by 1995 this option could reduce naval spending by as much as $6 billion compared with the funding level requested by the administration.

CONCLUSION

Future budgetary limits will clearly have an important effect on the Navy. If added funds are not available beyond 1995, for example, then the Navy will have to make major changes in its plans—perhaps reducing its fleet to no more than 310 ships and 9 carriers equipped with fewer of the most capable aircraft.

The debate about what Navy the United States needs and can afford should begin now. If the Congress decides to maintain the administration's planned forces, rapid growth in costs may not begin until the early or middle part of the next decade. Nonetheless, cost concerns could become much more immediate if the Congress elects to impose budgetary cuts larger than those proposed by the administration between now and 1995 or if substantial budgetary reductions continue in the years right after 1995. Moreover, key decisions that are being made in the next few years will have important effects on the choices that will confront the Congress in future years. Among those key decisions: whether and how quickly to design and field the new AX attack aircraft; whether to upgrade the capability and increase the cost of the F/A-18 aircraft; and the nature and cost of the attack submarine that will replace the SSN-21.

Finally, the debate over the future of the Navy is important to the U.S. defense budget and to the security of the United States. It would be preferable to begin that debate today, while there is time to deliberate, rather than waiting until budgetary pressures demand a quick answer.

APPENDIX

Costing Methods and Supplementary Data

The costs of the administration plan used in this testimony for 1992 to 1997 are those specified in the administration's Future Years Defense Plan (FYDP). Costs to maintain the administration's planned forces beyond 1997, and costs under the options in all years, were estimated using methods that vary according to the category of costs. In all cases, costs were based on budget authority and were calculated in constant 1992 dollars.

SHIP PROCUREMENT (SCN) AND AIRCRAFT PROCUREMENT (APN)

In 1991, ship and aircraft procurement accounted for about 17 percent of the Navy's total budget. In this testimony, most categories of ship and aircraft procurement were estimated explicitly. That is, CBO estimated the number of weapons that would have to be purchased based on the desired size of the force under each option and on the expected retirement age of existing weapons. Table A-1 shows estimated procurement for key weapons systems in various time periods. Table A-2 shows the retirement ages assumed in estimating required levels of procurement.

TABLE A-1. SELECTED SHIPS AND AIRCRAFT PROCURED FROM 1992 THROUGH 2010

Type of Force	Administration Forces[a]	Options I Less Sea Control	II Less Power Protection	III Larger Reductions
		Ships		
Aircraft Carriers				
1992-1997	1	1	1	1
1998-2010	3	3	1	0
Attack Submarines				
1992-1997	7	6	7	6
1998-2010	39	19	39	19
Guided Missile Destroyers				
1992-1997	22	22	18	9
1998-2010	38	38	23	15
Strategic Ballistic Missile Submarines				
1992-1997	0	0	0	0
1998-2010	6	6	6	6
		Aircraft		
AX				
1992-1997	0	0	0	0
1998-2010	370	370	298	125
S-3/EA-6[b]/E-2C/ATSA				
1992-1997	12	12	12	0
1998-2010	186	102	155	102
F/A-18/AV-8/STOVL				
1992-1997	348	348	149	234
1998-2010	842	842	942	1,168
P-3/Replacement				
1992-1997	0	0	0	0
1998-2010	261	165	261	165

SOURCE: Congressional Budget Office.

a. For 1992 through 1997, CBO used procurement plans published by the Administration. For 1998 through 2010, CBO assumed procurement plans that, combined with projected retirements and other assumptions, would maintain 12 aircraft carriers, 80 attack submarines, 150 surface combatants, 18 strategic ballistic missile submarines, 13 carrier air wings, 4 Marine Corps air wings, and the Administration's forces of land-based maritime patrol aircraft.

b. Excludes remanufactured EA-6Bs.

TABLE A-2. SERVICE LIVES ASSUMED FOR SHIPS

Type of Ship	Service Life Assumed (Years)
Ballistic Missile Submarines	30
Attack Submarines	30
Aircraft Carriers	45
Cruisers	40 or 30[a]
Destroyers	40
Frigates	30[b]
Amphibious Warfare Ships	35
Mine Warfare Ships	30
Patrol Combatants	30
Combat Logistics Ships	40
Other Support Ships	40

SOURCE: Congressional Budget Office.

a. CBO assumed a notional service life of 40 years for CG-47 Ticonderoga class cruisers and 30 years for others.

b. CBO assumed a service life of 20 years for about one-third of the 51 FFG-7 Perry class frigates and 30 years for the remaining FFG-7s.

Under the options, some weapons systems were retired at times before those suggested by the retirement ages in Table A-2. This was done in order to complete the transition to the new, lower force levels under the options in a reasonable period of time. For example, under the options some guided missile frigates were retired before they reached 30 years of service to keep surface combatant levels consistent with a force of 10 aircraft carriers. In other cases, procurement was undertaken somewhat earlier or later than would have been necessary in order to produce a reasonably smooth pattern. For example, in Option III an aircraft carrier is purchased in 1995, rather than in a later year, to avoid a precipitous decline in shipbuilding funds.

The unit costs of the weapons varied between the lower- and higher-cost cases shown in Tables A-3 and A-4. In general, the lower-cost cases used estimates for unit costs that are based on data from the Department of the Navy and the Department of Defense. Most other new weapons systems were assumed not to cost much more than the systems they replaced. For attack submarines and guided missile destroyers only, CBO assumed that—beginning in 2002—unit prices would be one-third lower than current unit prices. The Navy is studying lower-cost destroyers and submarines, and the lower-cost estimates assume that these new ships could be designed and developed within the next 10 years.

TABLE A-3. UNIT PROCUREMENT COSTS FOR SHIPS
(In millions of 1992 dollars)

Designator[a]	Weapons System	Lower Unit Cost	Higher Unit Cost
AGF	Command Ship	350	400
AGOS	Surveillance Ship	200	200
AOEV	New Logistics Ship	300	400
AR	Repair Ship	500	600
AS	Submarine Tender	400	500
ATR	Rescue and Salvage Ship	100	100
CVN	Aircraft Carrier	4,000	4,900
DDG	Guided Missile Destroyer	600	1,100
LHD	Amphibious Assault Ship	1,000	1,200
LSD	Dock Landing Ship	300	400
LX	New Amphibious Ship	400	500
MHC	Coastal Mine Hunter	100	100
PHM	Patrol Combatant	100	100
SSBN	Ballistic Missile Submarine	1,400	1,700
SSN	Attack Submarine	1,400	2,500

SOURCE: Congressional Budget Office.

a. Designators are symbols used by the Navy to represent types of ships. They are not acronyms.

TABLE A-4. UNIT PROCUREMENT COSTS FOR AIRCRAFT
(In millions of 1992 dollars)

Type of Aircraft	Administration Plan and Options I and II		Option III	
	Lower Unit Cost	Higher Unit Cost	Lower Unit Cost	Higher Unit Cost
AX	100	160	125	190
AH-1W	10	15	10	15
S-3/EA-6/E-2C/ATSA	70	140	70	140
CH/MH-53	30	40	30	40
CH-60B	30	40	30	40
HH-60H	30	40	30	40
F/A-18	60	75	40	50
P-3 Replacement	50	60	50	60
SH-60	30	40	30	40

SOURCE: Congressional Budget Office.

Under the higher-cost case, CBO assumed that unit costs grew above the levels currently estimated by the Navy. Where Navy cost estimates are not available, CBO used historical patterns as a guide. Ship costs, for example, were assumed to grow by 3 percent a year in real terms. This is consistent with cost growth between generations of ships.

CBO used average unit procurement costs to estimate costs in each year when a weapon was bought. These average costs do not capture the actual pattern of unit costs, which are higher early in a buy and lower later in the buy. Nevertheless, the use of average unit costs seemed appropriate for this testimony, which is designed to illustrate likely cost trends over a long period of time rather than to estimate precise costs in a particular year.

Portions of the APN account pay for modifications and spare parts. In the lower estimate of costs, the planned 1992 levels for these costs were assumed to remain constant in all years beyond the FYDP period. In the higher estimate, these categories of costs were assumed to increase above their 1992 level in proportion to increases in the remainder of the APN account.

OPERATING COSTS

Operating costs are defined in this testimony as funds in the appropriations for military personnel and operation and maintenance. Together, these operating costs account for about 59 percent of the Navy's 1991 budget.

Operating costs were estimated using CBO's Defense Resources Model (DRM). The DRM is primarily a projection model rather than a predictive model. It does not predict future action by the administration or the Congress, such as changes in operating tempos or reductions in costs achieved through efficiencies. Instead, the DRM projects costs based on current cost relationships that reflect the many personnel, facilities, and weapons policies affecting operating costs. Cost factors are computed on the assumption that the costs of operating a unit of force, for example, an

aircraft carrier or an air wing, are best measured by what the Navy now spends on that unit. When a new ship or wing enters the force, operating costs increase by the amount of the appropriate factor. Conversely, when an older weapon is retired, operating costs decrease by the amount of the appropriate factor.

CBO uses the DRM to estimate the incremental impact on the budget resulting from changes in the numbers of forces. The cost factors capture all the operating costs that are directly or indirectly related to the force levels. Other operating costs that cannot be readily related to ships or wings—for example, portions of the training and medical establishment, portions of base operating costs, and portions of administrative costs—are categorized by CBO as overhead. If changes in the numbers of forces are small, little or no change in these overhead activities would be expected. Larger changes in forces, such as those considered in this testimony, suggest eventual changes. Therefore overhead costs in this testimony are assumed to vary proportionately with changes in operating costs related to ships and aircraft.

Generally, cost estimates for operating new weapons systems are not available. Therefore, CBO usually assumes that a new weapons system will cost the same to operate as the old one it replaces. For example, CBO assumed that the cost to operate the new SSN-21 *Seawolf* submarine would equal the cost to operate existing attack submarines. This method may understate likely costs, because new systems usually cost more to operate than older ones. In a few cases CBO departed from this rule and made estimates using other systems as proxies for the new systems. For example, CBO used estimates of the cost to operate the CG-47 cruiser as a proxy for the operating cost of the new DDG-51 destroyer, because the two ships are roughly the same size.

Because the DRM estimates future operating costs based on current cost relationships, CBO's estimates do not always match the operating costs included in the administration's plan. In order to reflect the administration's policies, this testimony uses FYDP operating costs for the administration plan in the period 1992 to 1997. To estimate operating costs for the options in the years 1992 to 1997, CBO applied DRM estimates of percentage changes in costs (that is, DRM estimates of costs under the option compared with DRM estimates of costs under the administration plan) to FYDP costs. If, for example, the DRM estimates of 1995 operating costs under Option I were 2 percent less than DRM estimates of costs under the administration plan, then the estimate of 1995 operating costs for Option I would be set equal to 98 percent of FYDP operating costs for 1995.

This method ensures that, if the administration anticipates achieving efficiencies or other policy changes that affect operating costs, these same changes are reflected in cost estimates for the options. Indeed, it appears that the administration does plan to achieve some efficiencies. For example, after adjustment for inflation and for declines in the number of active-duty military personnel, Navy operation and maintenance funding associated with active-duty forces falls by 6 percent between 1991 and 1997 under the administration plan. This drop may reflect efficiencies related to implementing the recommendations of the Defense Management Review or to other policy changes. The General Accounting Office has, however, questioned whether all the savings associated with the Defense Management Review will be realized. If some or all these savings are not realized, the estimates in this testimony could understate the size of the Navy budget under the administration plan and under each of the options.

In the years beyond 1997, CBO's estimates of percentage changes were applied to the costs in the previous year to estimate operating costs. Thus, for example, if CBO projected a 1 percent decrease in operating costs between 1997 and 1998 under an option, then 1997 operating costs were decreased by 1 percent and used as the estimate of 1998 operating costs. This approach was used for the administration plan and for each of the options.

OTHER CATEGORIES OF COSTS

Some categories of costs cannot be related directly to the numbers of ships and aircraft. These include procurement costs for other procurement (OPN), weapons procurement (WPN), and Marine Corps procurement (PMC). Also included are costs for research, development, test, and evaluation (RDT&E), family housing, and military construction. Together, these categories of costs accounted for about 24 percent of the 1991 Navy budget.

These other categories were estimated in different ways under the lower- and higher-cost cases. Under the lower-cost case, they were assumed to remain at their 1997 level throughout the period from 1997 through 2010. Under the higher-cost case, the other categories were assumed to vary either in proportion to changes in

the size of funding for SCN and APN (in the case of procurement categories including OPN, WPN, and PMC) or in the size of total Navy funding (for RDT&E, family housing, and military construction).

Senator KENNEDY. I want to express our appreciation for the work which has been done on this study which we requested close to 2 years ago. It really gives us some focus both in terms of the short, medium, and long term. I think what it does do is establish some bench marks which were points of departure.

We have been asking ourselves whether it is realistic to assume ramping up in the mid-1990s. I think, quite frankly, it would be, if there were the kinds of threats that appeared to loom on the horizon that would suggest some really important security issues and questions. Whether we can, over any period of time, expect the reductions in terms of cost. I think we see, in certain kinds of weapons systems, that, after the preliminary and initial investment, there is a ramping down in terms of cost. I suppose that is reasonable, hopeful, and optimistic, looking back over the past experience. Not with regard to some particular systems, but certainly as a generality.

Are we going to be, given the new world order, looking at different technologies that may, for example, be of additional cost? Maybe they will be cheaper, in terms of anti-mine warfare and research and development. Maybe that is a good deal less expensive than some of the more exotic types of developments we have seen taken place.

I think one of the most important aspects of the observation is looking at the different alternatives, the projections—less sea control, less power projection. Less sea control meaning general assumptions with regards to what the nature of the threat would be, in terms of Soviet projection. Less power projection, maybe in terms of the questions that we are going to be facing in Third World kinds of situations, which would appear to be certainly something that we have to give greater attention to.

I suppose the value of a study like this is that you are going to have to make judgments and decisions pretty soon about where those flow lines are going to be over a period of time. I think we have to ask ourselves, are we doing it in terms of sort of just general belt tightening? Are there percentage cuts? Are the percentage cuts with some alternatives? Is there a beginning of thinking in terms of where these flow lines might bring us? I think that this is really stimulating a good deal of thinking, at least on the part of the members here and from what we have heard in terms of the leaders in the Navy and their point of view as well.

I will ask just a few questions, and then we want to move on to hear from the Navy. The first one deals with the industrial base assessment, and I will ask the staff to follow the 10-minute rule for us, if you would please. Consider what I just said to be less than a minute. [Laughter.]

Senator KENNEDY. For example, because ships last roughly 30 years on average, the annual procurement of ships to support a 310-ship fleet would average about 10 ships per year in the longer term—of the 310 divided by 30 equals, the 10.3. In the near term, because of the uneven procurement cycles, that number could be even lower, as evidenced by the average of about eight ships per

year in the Navy's current shipbuilding plan. Do you have an assessment of what effect our procuring such small numbers may have on the shipbuilding and supporting industries?

Mr. HALE. We have not focused on that, Mr. Chairman. I think it is fair to say that the industrial base, particularly the shipbuilding base, is going to shrink under the administration's plan, and that would be exacerbated under a plan that resulted in 300 or fewer ships. To pick surface combatants as an example, we are probably heading—certainly under a 300-ship Navy—to production by one shipbuilder. Within a few years, we would be confronted with the question of whether or not to stop production altogether because that small a Navy would not require the purchase of more vessels. That would mean that for a number of years there might be no shipyards producing surface combatants. Alternatively, we would have to buy ships that we did not absolutely need in order to maintain one industrial base. This issue has not been the focus of our work, but it is clearly a problem. It does not just affect ships, but ships are an important part of the industrial base problem.

Senator KENNEDY. Well, it is certainly something we have to give a good deal more attention to than we have on this committee. Your assumptions about the lower-range cost estimates for future attack submarines and destroyers suggest a cost-reduction of one-third is achievable compared to the SSN-21 and the DDG-51. Could you provide some assessment of how difficult or how easy it would be to achieve these goals? In other words, are the goals too ambitious or not ambitious enough? Are the ships that we could buy for that price really worth buying?

Mr. HALE. I am not sure that I am the best person to make that last judgment. Let me say that it is clearly feasible to produce cheaper ships. The Navy is operating ships in the fleet today that are more than one-third cheaper than the SSN-21 and the DDG-51. The Navy can do it. I think the hard trade off is the one you cited: Would cheaper ships meet future threats? I suspect that the realism of cheaper vessels depends on where the world heads. If the Soviet Union continues to move toward becoming a functioning democracy and invests a lot less in its weapons, I would hope that the Navy could use somewhat cheaper and relatively less capable vessels. If the Soviet Union does not, I suspect that the United States will be faced with the need to increase the defense budget in order to afford more capable weapons.

It is hard to know now where that is going. Since it takes so long to design ships, I would hope that the Navy would put significant effort into designing some cheaper vessels, because they may well need them in the future, if they do not want to head to a fleet of 300 or even fewer ships.

Senator KENNEDY. You have made some of your preliminary results available to the Navy for comments. I understand this is CBO's independent assessment, but I think it is well the Navy was given the opportunity to comment. Were there any comments from the Navy that you could not accommodate in the analysis you are presenting this morning?

Mr. HALE. First I need to say that, yes, we did share it with them, and we benefited from their comments, although, in no way did they approve these results. There is no formal sanction or rejec-

tion, as far as I know. One question that was raised regarded whether we could postpone retirements of some aircraft, perhaps the S-3s, and therefore avoid some procurement costs. In my prepared statement, we assess the costs if you do not have to buy a successor to the S-3. It does lower the growth, although it does not eliminate the need for growth in the years beyond 1995.

I think the concern we would have, and I think the Navy would have it too, is that we are already planning to keep these aircraft and ships to pretty venerable ages: 20 years to 35 years for aircraft, 30 to 45 years for ships. It is not obvious how much farther you can go, particularly for carrier-based aircraft.

In summary, one issue that the navy raised was, will we have to buy a replacement for the S-3? We showed the alternative in the testimony, and I think their plans constitute an issue you probably need to take up with them.

Senator KENNEDY. What are the principal areas of the difference? Was it with regard to aircraft and retirement?

Mr. HALE. I think it was probably more with regard to aircraft, so far as I am aware. Again, they did not provide us any written or formal comments. This was an informal process. We like to keep it that way. Is that fair?

Ms. PIERROT. I think so.

Senator KENNEDY. Thank you. Senator Cohen.

Senator COHEN. Mr. Chairman, as I listened to the testimony of Mr. Hale and looked at the report, a thought kept coming through my mind. I remember hearing a Woody Allen commencement address, and he said something to the effect that you have two choices facing you. If you make choice number one, it will lead to mutual annihilation. If you make the other choice, it will lead to mass impoverishment and starvation. I wish you good luck on the choice that you make.

It seems to me that the situation is not quite as dramatic as that, but when we look at what you are projecting for the future and what this country's traditional role has been in emphasizing maritime power, that we still remain that island nation. Yet we see, in looking at those budgets, we are just going to shrink it down. We have the notion that somehow we are going to have less expensive systems in the future with greater capability. I am not sure that is ever going to be realized.

I can recall when our mutual friend Gary Hart was on this committee, and he contributed a great deal to the debate about the issues back in the early 1980s; for example, about whether we ought to have smaller aircraft carriers. Let us have more aircraft carriers, smaller, perhaps less capable; but the analysis then revealed that you might have a less capable ship that is more vulnerable, and you would need more ships to defend it, and it would have even less power projection.

I think we have got to really start thinking through exactly where we want to be if we are going to maintain our security. There is also the suggestion that because the Soviet Union might become less of a threat in the future, become more democratic in nature, that therefore we can comfortably rely upon less capability, less power projection, less sea control, whatever label you want to

put on it. But that sort of ignores the growing threat of violence from Third World countries.

Iraq, for example, is a Third World nation that caused us considerable consternation. We ended up sending our most sophisticated stealth fighter-bombers against a Third World nation. We now face the prospect that China may be seliing more sophisticated, upgraded weapon systems to Syria or Pakistan, or other countries.

The notion that the Soviet Union might present less of a threat to us should not lead us necessarily into concluding that therefore, we can afford to have a less capable naval power as such. Other services could make the same argument, but I think particularly so with respect to naval power.

The other point is that even though the Soviet Union appears to be moving down a road of democratization, their military spending does not reflect that. That is something that we will have to resolve politically, obviously; but when you look at the number of ships they are building, it causes concern. Senator Kennedy focused upon this specifically at our last hearing. We heard the figure nine submarines, and we discussed how many are for export to other countries, and how many are diesel versus nuclear powered. What does that mean ultimately in terms of their production capability? What does it mean for their industrial base?

I still think that we have to keep our eye pretty much on what is going on within the Soviet Union as far as their shipbuilding program is concerned.

I do not have any questions, Mr. Hale. I think we should take your study and then try to pose some questions to the witnesses who succeed you, but I must tell you that the—well, let me ask you this.

Have you made any cost analysis of what it would mean to have one shipyard producing, let us say, the surface combatant, in terms of what we have been able to achieve by having very significant competition during the 1980s? Could you make a case, for example, that while, in the short term, it might apparently cost somewhat more to maintain two shipyards producing surface combatants, but ultimately, you are preserving an industrial base and ultimately you are still preserving the ability to have some real competition which will hold down the costs? In the late 1970s, there was a single yard producing the Aegis cruisers, and once competition was introduced, the unit cost came down rather substantially. Have you made any analysis of this kind?

Mr. HALE. No. We have not explicitly analyzed that issue, Senator Cohen. My guess is that it does depend a lot on the size of the Navy. If you are going to buy two ships a year, it probably does not make much sense to have two yards, even though I think your point is well taken, that you would end up paying more per ship over the long run with one shipyard. With a 300-ship Navy and less than 100 surface combatants, we are probably headed to buys of two or three ships a year.

If we stay at the level of the administration's plans (450), the case for several yards is probably a lot better. We have not focused on those kinds of issues. Frankly, costing out four different Navies over 20 years came close to overwhelming us. We were kept busy.

Senator COHEN. It is worth pointing out, I think, that when you say less sea control, less power projection, those are labels that you have used which mean fewer ships. It does not mean that you cannot compensate on the number of ships with different types of capabilities to make up some of that difference.

Mr. HALE. Right. As I tried to point out, the vessels we are building today are, by some simple measures such as missile-carrying and weapons-carrying capacity, much more capable. In addition, they have a variety of other improvements. I think ship counts alone really do overstate the decline in capability. Nonetheless, at some point, quantity does have a quality all of its own, and I think that is the point that you were making.

Senator COHEN. Thank you. That is all I have, Mr. Chairman.

Senator KENNEDY. Thank you very much. We appreciate it.

Admiral Kelso, we now look forward to hearing from you and Secretary Garrett. We are glad to have you. We appreciate your patience in letting us have the CBO lay out their program prior to hearing from you. I think protocol would certainly have you come first. I think it will be, at least for our own information, valuable for you to have heard their presentation first. We express our own appreciation to you for your courtesy to us. We will look forward to hearing from you, Secretary Garrett.

STATEMENT OF HON. H. LAWRENCE GARRETT III, SECRETARY OF THE NAVY

Mr. GARRETT. Thank you very much, Mr. Chairman. It is always a pleasure and a privilege to appear before the subcommittee. Admiral Kelso is here with me this morning. We prepared a joint written statement which we would ask that you insert in the record.

Senator KENNEDY. It will be in the record in its entirety.

Mr. GARRETT. Thank you very much, Mr. Chairman. This morning, the Chief of Naval Operations and I are appearing before you to discuss what we believe are some of the larger issues affecting the strategic future of our Navy and, of course, the Marine Corps. The strategic future includes some significant changes in the way naval forces are going to be used by the United States in the coming decades. I would like to address, if I may, how we believe the Navy should be built and structured differently from the way it was during the Cold War, and even during the Persian Gulf war.

Mr. Chairman, there is very little disagreement nationally that we are participating in some basic defining decisions. The strategy and the force structure that we choose now will mark the course of this Republic for years to come. In this defining moment, I think the most important and the hardest question to answer is just what has changed for the United States. I would like to give you my own views about what has changed strategically and in terms of our future requirements now that we have recently seen the end of two wars, the Cold War and the one in the Gulf.

First and foremost, our relationship with the Soviets has changed. This is a consequence of attempts at real reform within the Soviet Union—and more importantly, as a result of changed Soviet behavior. In brief, I believe that the Soviets cannot and will

not in the foreseeable future challenge us directly. They will not make a renewed bid for a socialist world dominion.

We remain the only superpower in the world. It is our duty and our obligation as a nation to live up to the responsibilities and obligations inherent in that status. The Soviet threat is, for the most part, receding as Senator Cohen pointed out—both in the capabilities of their forces and in their political intentions. This diminished threat allows and invigorates the new National Security Strategy that both the President and the Secretary of Defense have previously described. We are now able to concentrate our attention on regional crises and building forces sufficient to meet a strategic need.

The naval aspect of the Soviet realignment certainly parallels the general trend I have just described. My only caution, sir, would be as to degree. Unlike the wholesale post-Cold War reduction of forces in Eastern Europe that we have seen now since 1989, the Soviet Navy is building down at a much more shallow rate—and actually improving technologically. For the U.S. Navy, this only means that our "sufficiency" must be carefully measured and carefully considered.

The second factor of change relates directly to the first. In the future, we will and must be less driven by threats—especially by the perceived Soviet threat—and more considerate of what our own national and our own alliance aims are. It is time to refocus on the enduring realities to which Senator Cohen alluded. We must use our position of international leadership for gainful purpose, and we must remain secure enough in our own capabilities so as not to invite threat or challenge by others.

That realization, I submit, requires some new thinking. The Chief of Naval Operations, the Commandant, and I have recently set out this new thinking, in part, in the Naval Institute Proceedings in the essay entitled "The Way Ahead." I want, if I may, to elaborate briefly on our message there. In the future, it seems to me, being stewards of the Nation's naval forces, we must be better able to justify our resource requirements to you.

The force of minimum sufficiency that I described to you earlier this year and to which the current budget agreement will take us, is roughly the shape of the Navy that can seize this opportunity for the United States. If we sustain a force of about 450 ships, and then commit to its modest modernization over the coming decades, I believe we can uphold our national strategic goals. We will be able to do this because of the undergirding and enabling effect our minimum-sized Navy will have.

We can insure that no single nation, or even a coalition of nations can challenge our national interests. With a reliance on our own alliances and coalition partners, we will reinforce a more stable and economically secure world. Our independent ability to prevail at sea is the only means to ensure that no nation will be able to mount military or economic threats against us. This is a subtlety that island nations have always understood.

The third factor of real change in the world today is just how much regional violence has emerged. Traditional disagreements among nation states, racial and ethnic animosities, established countries emerging economically, and ancient land disputes will no

doubt continue to exist, as will the consequences and conflicts arising from those disputes. I submit that all of this is of significant consequence for the Navy and the Marine Corps, and the Nation.

When ambiguity and political emotion fuel international affairs, it is especially important for us to preserve some purely national options. Sometimes the mere exercise of sovereignty by another nation is the most important crisis action to be taken by that nation. If that exercise of sovereignty means denying U.S. basing rights or denying U.S. overflight rights, independent U.S. Naval forces may well be our only usable military asset. If that is the case, it is critical to have those naval forces reasonably available, ready and capable to respond.

In situations where we are unable or denied the ability to use our powerful land-based forces like those we employed recently in Saudi Arabia and in Kuwait, the United States has only its naval forces to rely upon. The uncertainties of the world today and tomorrow require our mutual consideration of these possibilities.

Mr. Chairman, those are some of the strategic changes that have occurred, in my view. I would also like to identify, very briefly, four operational changes that are shaping our force structure considerations in the way ahead. First, we are changing our emphasis to power projection. The demands of strategy, as I have outlined them, are for integrated strike warfare, and bringing expeditionary forces to bear in littoral regions of the world.

Second, with our increased emphasis on power projection is a change in what we see our ASW problem to be. From here on, at least in the foreseeable future, we will likely face littoral or shallow water ASW challenges, not wide scale war at sea in the North Atlantic. Our research focus has already shifted to this area.

Third, we learned from the Persian Gulf that our strategic emphasis on regional power projection can easily and cheaply be made more difficult by the use of sea-borne mines. In the way ahead, counter-mine warfare will take on a real priority.

Fourth, low observable technology and precision guided munitions must be a part of naval aviation of the future. You have heard me say this before, but I am now convinced that an urgency exists of which we were not fully aware before the Persian Gulf war. As our naval aviation plan develops and the AX technology emerges, I am asking the naval organization, as the CNO can attest, some very hard questions. For example, just how much stealth is necessary? What is the technological edge we really need without gold plating or inventing new missions? What is affordable and reasonable within any given geo-strategic landscape?

Minimum force sufficiency and affordability will govern the character of the Navy and the way ahead. I remain fundamentally committed to balancing these competing requirements against limited and declining resources. The receding Soviet threat coupled with the post-Cold War challenges have led me to submit to you a proposed minimum base force for 1995 and beyond. A force which will keep us secure in what Mr. Hale described as the uncertain years ahead.

Thank you, Mr. Chairman. With your permission, I will respond to any questions you may have following the statement of the Chief of Naval Operations.

[The prepared joint statement of Mr. Garrett and Admiral Kelso follows.]

PREPARED STATEMENT OF HON. H. LAWRENCE GARRETT III, SECRETARY OF THE NAVY AND ADM. FRANK B. KELSO II, CHIEF OF NAVAL OPERATIONS

INTRODUCTION

As we prepare to enter a new millennium, we are also aware of leaving an old, familiar order. With the Cold War and Operation Desert Shield behind us, it is time to challenge many of the ground rules and assumptions of the past 45 years. We must reshape U.S. national security strategy, naval force structure, tactics, and operating patterns that were appropriately wedded to the concept of global struggle at sea with the Soviet Union. In the future, we will face enormous political and fiscal pressures to reduce the national debt—pressures that unquestionably will affect the level of resources available for defense in the future.

We must respond to a new environment. That will require that we look for new initiatives and prepare to march in different directions. We must work to shape and guide the forces of change in the direction that best serves the needs of our Nation.

Though we cannot predict with confidence the exact geopolitical terrain of the new world order, we know which fundamental U.S. interests will remain intact. The defense of our Nation, our people, and our way of life will continue to be our foremost objective. Geography will not change. America will remain dependent on the seas for commerce, security, and as an avenue for projecting power and influence abroad. We must, therefore, preserve the means of ensuring maritime superiority with a Navy and Marine Corps able to meet the challenges of an uncertain future.

We must remember, however, that the American people ask more of their military, including their naval forces, than secure coastlines. Americans seek to lead the nations of the world to greater stability and prosperity. The military is expected to play a global stabilizing role, evidenced most recently in the commitment of approximately one half million men and women to the liberation of Kuwait. In addition, America demands that the military protect its citizens around the globe, including remote locations such as Liberia (SHARP EDGE) and Somalia (EASTERN EXIT). Finally, the American people are a caring people and fully expect their military to provide relief and support where needed, an expectation we fulfilled with the Kurdish refugees (PROVIDE COMFORT) and the Bangladeshi hurricane victims (SEA ANGEL). For the United States to pursue a policy of global leadership, it requires a Navy and Marine Corps that can project maritime capabilities across the oceans into littoral areas around the world.

IMPLICATIONS OF CHANGE: NATIONAL SECURITY POLICY

How will the geopolitical changes of the past year affect our national security policies?

- In the future we will likely face increasing limitations on U.S. access and influence. Absent a Saddam Hussein as a focal point, friends and even allies may be reluctant to subordinate national interests to a broader common purpose. While forward naval presence and the need to develop and maintain regional alliances will be as important in the future as in the past, the ability to operate naval forces independently, whenever required, remains key.
- Advanced military technology and equipment will proliferate. Regional powers and emerging Third World nations will accelerate their acquisition of modern combat weapons and delivery platforms.
- This will be a period of uncertainty. Warning signs for regional crises will become increasingly ambiguous and reaction times will be shortened as the identity and motives of potential adversaries, and the timing and scenario of hostile events, become more difficult to discern.

AN EVOLVING STRATEGY

For almost half a century the United States and a coalition of allies focused on the possibility of global war to be fought primarily on the European continent and in its adjacent waters. In contrast, our evolving strategy must focus on more limited contingencies in remote trouble spots where America's regional interests are involved.

President Bush, in an address at Aspen, Colorado, on August 2, 1990, stated that U.S. defense policy must adapt to the significant changes in the world, without re-

glecting the enduring realities of the Nation's security. The President outlined a future U.S. defense policy based on four major elements:

- Strategic Deterrence
- Forward Presence
- Crisis Response
- Force Reconstitution

Strategic Deterrence characterizes future U.S. grand strategy, both nuclear and conventional. Deterrence costs less than any level of conflict and will remain the cornerstone of U.S. defense policy.

The *forward presence* of U.S. forces near areas of potential crisis remains a key element of national security and deterrence strategy. In a time of decreasing availability of overseas bases for land and air forces, forward deployed elements of the Navy and Marine Corps will be the primary means by which to preserve American regional engagement. In Europe, for example, when most of the U.S. ground and air units return home, naval forces will remain near Cold War levels. General Galvin, CINCEUR, has made clear this need for continued high numbers of naval forces.

Global *crisis response* rather than global war with the Soviets will be the focus of planning. Given that the bulk of the world's population lives within 50 miles of the sea, our naval power projection capabilities will become an increasingly important element of U.S. crisis prevention and management efforts. Naval crisis response is a complex business. It means much more than protecting sea lines of communication. It means backing up forward deployed deterrent forces with the credible means to project military forces, rapidly, around the globe, to overcome increasingly high-tech threats . . . usually to places lacking the infrastructure and modern facilities which were made available to us recently in Saudi Arabia.

Reconstitution preserves the capacity to face a resurgent global threat to peace. While our new defense strategy is geared primarily to regional threats to U.S. interests, it also must take into account the uncertainty surrounding the ongoing upheaval in the Soviet Union and Central Europe. For the foreseeable future, the Soviets will remain the only potential adversary with the capability to destroy us as a Nation. The United States must, therefore, maintain the capability to deter a resurgent Soviet Union.

COMBINED AND JOINT OPERATIONS

Alliances remain a strategic necessity for the nation, but their character may differ substantially in the future. We must heighten our emphasis on combined operations and training with national forces of many regions—both to facilitate cooperation and coordination with them and to maintain our own expertise in likely operating environments.

Among U.S. forces, joint power projection operations have proven a most efficient and effective method to protect worldwide U.S. interests. This is no accident. Decades of organizational focus and institutional ethos have produced unique service capabilities, that, when combined in a joint operation, produce a truly synergistic effect.

Operation Desert Shield/Desert Storm provides an example of the type of joint operation—more exactly, joint force sequencing operation—which the Navy and Marines are prepared to execute in the future. As a result of forward deployment, our carrier battle groups were the first forces with significant combat capability to arrive on scene. Sea based forces, following a surge from bases throughout the world, were also the first to build up adequate sustainability and logistics for extended operations or combat. The Maritime Prepositioning Squadron ships allowed us to put a self-sustaining force of Marines on the ground within 2 weeks of the Iraqi invasion of Kuwait. This combination of maritime units enabled the rapid flow of joint and allied forces into the region. Once the Allied Coalition was established, the previously formed ties from global naval deployments and an extensive network of combined exercises allowed for easy integration of coalition naval forces. Together, U.S. and allied naval forces maintained complete sea control and enforced the United Nations sanctions. Following successful combat operations, the continued presence of unobtrusive naval units permitted the withdrawal and reconstitution of air and ground forces to meet future contingencies. Naval forces continue to operate in the region, conducting maritime interception operations, minesweeping, and flying combat air patrol over Kuwait.

It is clear from Operation Desert Shield/Desert Storm that, when combined, the service's unique missions and functional capabilities are complementary, enabling, and enhancing. Nevertheless Operation Desert Shield/Desert Storm was unique in many ways. Certainly, there are different scenarios we can expect to see in the

1990s. We must maintain capabilities which hedge against this uncertainty of the next scenario. Accordingly, maritime forces will continue to be required to establish sea control as a prerequisite for power projection ashore.

When we do have to fight in the future, battle space will be more complex. Control of the air, sea, and undersea environments is essential to successful military operations on land. Sensors and communications systems designed for blue-water operations may not work as well in confined areas, shallow seas, or over land. The threats posed by shore-launched cruise missiles and shallow-water mines and submarines will present new challenges. Quick-reaction combat capabilities and the ability to maintain an accurate tactical picture will be critical for success in these littoral areas.

IMPLICATIONS OF CHANGE: EMPLOYMENT/DEPLOYMENT CONCEPTS

Forward deployment of naval forces in peacetime promotes regional stability. Naval forces have been used for 45 years to demonstrate continuity of commitment, strengthen friendships, enhance readiness, and reduce reaction time in crises. But new military and fiscal realities require that we revamp our employment and deployment concepts and maximize the benefits of mobility and flexibility.

In the coming decade naval forces will be called upon to conduct a wide variety of missions that cover the spectrum from peacetime situations through crisis response to conflict resolution. Many of these missions, such as strategic deterrence and protection of American lives and property, have been with us for years. Others—such as presence, humanitarian assistance, nation building, security assistance, counternarcotic, counterterrorist, counterinsurgency, and crisis-response operations—will receive new emphasis as we focus our efforts on maintaining regional stability.

Determining just how much naval presence may be required in a given region at a given time is not a precise science. What is clear is that decreasing numbers of ships and people mean we can no longer conduct Cold War-level deployments. It is also clear that gaps in presence can lead to instability, power vacuums, and regional perceptions of American apathy or disengagement.

Meeting forward presence requirements with fewer assets calls for better exploitation of the mobility and flexibility of naval expeditionary forces. That means new patterns in length and location of deployments, as well as in the composition of battle groups and amphibious forces.

The crisis action and deterrent-force modules recently developed by the Marine Corps are examples of the kind of flexibility that is needed. Recent operations off the coasts of Liberia and Somalia were executed successfully by a task force composed of amphibious ships, a Marine special purpose force, and surface combatants. To respond effectively to larger crises, however, we need carrier aviation and forcible-entry power, together with credible surge capability.

From the Korean war until the end of the 1980s, we concentrated our operations in deployment hubs, where American and Soviet interests overlapped at likely points of crisis. The current changes in U.S.-Soviet political and military relations will allow greater freedom for operations in broader, less-rigid zones of national interest.

In the future, the need for focused forward engagement and a credible surge capability—more than historical deployment patterns—will dictate peacetime employment of naval forces.

IMPLICATIONS OF CHANGE: FORCE CAPABILITIES AND STRUCTURE

President Bush's new national security strategy demands naval forces that possess a wide range of capabilities for a broad menu of tasks. These must include: sea-based strategic forces for continued deterrence of nuclear attack; forward-deployed presence forces with full sustainability; expeditionary surge forces that can react rapidly to any crisis; and a balance of maritime prepositioned ships, fast sealift, and equipment prepositioned ashore.

DETERRENT FORCES

With the Trident submarine force we will maintain a modern and survivable sea-based strategic deterrent well into the next century. At the same time, our attack submarine force will retain the numbers and capability needed to hold at risk those sea-based strategic platforms which could threaten the United States. Further, we cannot yet discount the major open-ocean warfighting potential of the Soviet submarine force, which has yet to experience any downturn in production rates or technological capability.

POWER PROJECTION AND SEA CONTROL FORCES

Our carrier battle groups and amphibious ready groups are the cornerstones of our forward deployed forces, and will remain so. These supremely potent, agile forces can be tailored to include varying numbers and mixes of tactical aircraft, surface combatants, submarines, logistic support ships, and Marine Air-Ground Task Forces. They can be assigned on short notice to conduct combat operations—for extended periods—anywhere in the world.

During the 1990s we expect to tailor the composition of our carrier battle groups and amphibious ready groups to suit specific situations. We will sometimes be operating with smaller battle groups, particularly as our older surfaced combatants are replaced by fewer—but more capable cruisers, amphibious ships, and destroyers. Adding the newest generation of strike aircraft to the air wing, just after the turn of the century, will enhance our capability significantly.

Improved capabilities, however, can never be a substitute for adequate numbers. A single unit still cannot be in two places at one time. Today we have enough carriers and amphibious ships so that we can deploy a CVBG or MARG, from forward deployed positions, to any corner of the world's oceans within 7 days. We must have enough carriers, amphibious ships, surface combatants and submarines to maintain focused, forward, simultaneous peacetime presence in several regions—along with a surge capability to respond to larger crises—and enough redundancy to assure periodic rotations once our surge forces are committed. To meet these goals we need at least 12 carriers—any less and we will compromise either operational flexibility, the ability to surge in crisis or the welfare of our men and women.

Complementing carrier air power is the formidable firepower distributed through our modern surface combatants and attack submarines. Major advances in weapons technology have brought longer ranges and greater accuracy in weapons and combat systems small enough to be employed from a variety of platforms, making it possible to disperse a significant amount of firepower within a battle group. The effective employment of Tomahawk missiles against Iraq from battleships, attack submarines, cruisers, and destroyers demonstrated the kind of multi-mission utility we can continue to get from naval forces of the future.

The tactical advantages and flexibility of sophisticated, state-of-the-art weapons does not obviate the need for guns and other, less-complex weapons. We must continue to distribute all forms of firepower among many platforms.

MARINE CORPS COMPONENT

Distributed firepower also expands our capability to project power landward. But controlling events ashore ultimately means putting warriors across the beach with the capability to do what must be done. The flexibility inherent within the Marine Corps force structure of three Active and one Reserve divisions, three Active and one Reserve air wings, and three Active and one Reserve force service support groups—called Marine Expeditionary Forces (MEF)—provides joint CINCs with a wide range of military capabilities. Our existing MEFs provide a reservoir of integrated combined arms power from which Marine Air-Ground Task Forces (MAGTF)—all special-operations capable—can be task-organized to execute, simultaneously, a wide range of missions around the globe.

MINE WARFARE

Any consideration of naval operations along the world's littorals raises the specter of mine warfare. In the maritime environment of the 1990s, we will have to be proficient in mine warfare, both offensive and defensive.

We have focused most of our future mine warfare efforts in the area of countermeasures. Our helicopter and surface mine countermeasures forces are getting better all the time, but we face new challenges as mine technology spreads worldwide. Shallow-water mines, for example—readily available at low cost and used in great numbers by the Iraqis—are simple weapons, easily employed by potential adversaries. In the 1990s, we will continue to explore and develop new technologies, including laser mine detection and the use of remotely piloted underwater vehicles for locating and neutralizing naval mines. We shall also improve our organization and training in this area.

SEALIFT AND PREPOSITIONING

An equally vital—though until recently, less-noticed—contribution to our maritime power is strategic sealift. During the first 60 days of Operation Desert Shield, 85 percent of all cargo sent into the Persian Gulf theater moved by sea. We fully

recognize that strategic sealift will be an even more critical component of our maritime force structure in the 1990s, and we are preparing for the challenge of providing the right mix and numbers of sealift assets for future contingencies.

Over the past 10 years, we have spent more than $7 billion on sealift. Our sealift force numbers 130 ships, including eight fast-sealift ships capable of meeting demanding, high-speed schedules with vital materials for forces airlifted to the scene of action. We expect to add to our inventory over the next few years.

The current shipping pool is sufficient for scenarios with long warning times, but even large numbers of fast-sealift ships would be insufficient for most short-warning scenarios. This is why we have maintained three sets of prepositioned equipment and sustainability on 13 of our ships, with each set capable of equipping and sustaining a Marine Expeditionary Brigade.

In Desert Storm, this prepositioning program proved its worth despite the short warning time and long distances involved. No matter what the mode of transportation, however, maritime and aerospace superiority are the keys to our ability to deliver materials when and where needed.

PERSONNEL RESOURCES: ACTIVE AND RESERVE

Preserving our leadership base is more important to our ability to maintain future maritime superiority than any category of weapon systems or delivery platforms. A professional officer and enlisted leadership core is essential for any combat-ready military force. Rebuilding an educated, trained, and experienced cadre of professional leaders is difficult and takes much more time than rebuilding force structure. Training and education will be top priorities in the 1990s.

In addition to the appropriate mix of skills and experience levels our personnel force will require in the 1990s, we will also need the right mix of active and reserve forces. As specified in Title 10, U.S. Code, reserve forces exist to buttress active forces in times of war or national emergency, and when other exigencies demand. Our ready, trained Reserve component clearly demonstrated its value in Operation Desert Shield.

Since we now anticipate additional warning time with respect to global threats, we can best use shrinking resources by planning for phased mobilization of those reserves needed to augment regular forces in the event of major conflict. Toward that end, we are transferring roughly 25 percent of our current inventory of surface combatants, the *Knox* (FF–1052) class frigates, to the Reserves. Primarily designed for the ASW convoy mission, these ships will be placed in reduced availability, with operating time devoted exclusively to Selected Reserve training, but reconstitutable for full duty in 180 days.

THE NAVY OF THE 1990S AND BEYOND

The most perplexing question facing the Navy in the uncertain decade ahead is *How big a force do we need?* Three principal strategic criteria must be balanced against the constraints of a 25 percent budget cut to properly determine the size of our force.

- We need a fleet capable of executing the President's National Security Strategy. We must be able to maintain active forward engagement and be able to reinforce forward deployers in the event of a regional contingency. The strategy also mandates sufficient sea-based strategic nuclear forces to deter a resurgent global threat or emergent nuclear-armed adversary.
- We need a fleet that can sustain the level of readiness, responsiveness, and availability required to implement the strategy of deterrence. To sustain that level of readiness, our ships, submarines, and aircraft must be well-maintained and combat ready. Sufficient time and resources must be allocated for overhaul, maintenance, and training. Availability is largely a matter of having sufficient numbers of ready and capable vessels forward deployed to regions where trouble is likely to occur.
- We need a fleet that affords our valuable people a decent, realistic quality of life. To do that we must operate our forces in a way that provides, at a minimum, a stable sea and shore rotation pattern. Current guidelines concerning the time sailors and Marines are away from home port must be preserved, even while force structure shrinks. We also must provide them adequate time for maintenance and training. Our sailors and Marines must continue to have confidence in their ships, their equipment, and their shipmates.

By balancing these criteria with budget realities, we hope to size our balanced total force for the future at about 450 Active and Reserve ships, plus three Active

and one Reserve Marine division/wing teams (Marine Expeditionary Forces). Plans to achieve necessary reductions are in place. We will get smaller in a rational way. But in order to do this it will be necessary to operate smarter as well as more economically in the future, sending fewer, though more capable ships on an assignment than was done in the past.

But there are clearly increased risks associated with a 25 percent reduction in our naval forces. Though Operation Desert Shield is officially terminated, naval commitments remain significantly above those of 1990. On August 2, 1990, six ships were deployed to the Persian Gulf/Indian Ocean/Red Sea; today, 32 ships remain on station while we continue maritime interception operations, and an Amphibious Ready Group/Marine Expeditionary Unit stands ready in the Red Sea. A smaller force can meet these day-to-day commitments, but it would be hard pressed to maintain the wide balance of capabilities required to counter sudden, unexpected geopolitical challenges.

Quality of life for our sailors remains a concern. While we believe the 450 ship fleet would be able to meet our quality-of-life goals during routine peacetime operations, this force level provides less elasticity than the fleet we are supporting today. As a consequence, we would be less able to support a regional crisis for more than a few months without major departure from the preferred rotation and deployment policies. The smaller fleet will be less balanced, will have less surge capability, and will be less able to respond in as timely a manner as we have in the past. This will place a premium on timely regional indications and warning, followed by early political decisions. We must be careful not to encourage, by untimely absence, any would-be adversaries who might seek to fill a perceived power vacuum or exploit an apparent weakness in our commitment to protecting our regional interests.

A comparison between pre-Desert Shield and post Desert Storm maritime commitments helps to illustrate the tradeoffs and limitations involved with a smaller fleet. Prior to Desert Storm the Navy was tasked with maintaining a CVBG presence in the Indian Ocean and North Arabian Sea for 6 months out of 12, while supporting continuous CVBG presence in the Mediterranean and Western Pacific. The Navy also maintained five surface combatants and a flagship in the Persian Gulf, at least seven ships in counter-narcotics stations off Central and South America, at least twelve nuclear attack submarines deployed around the globe, and Amphibious Ready Groups (ARGs) continuously in the Mediterranean and Western Pacific. For 10 months out of 12, the Western Pacific amphibious presence was supplemented by an additional ARG with Special Operations Capability to provide enhanced flexibility. These presence levels resulted, on 2 August, in about 77 ships forward deployed. The 450 ship Navy was sized to support these requirements but without the flexibility that we enjoy today with a Navy of almost 550.

Since Desert Storm the Navy is supporting requirements for full-time CVBG and amphibious presence in the Mediterranean, Western Pacific and Persian Gulf. This has resulted in approximately a 50 percent increase in the number of ships forward deployed which now total 114. Today's Navy has the flexibility to support these additional requirements, but even today they result in additional time away. Our sailors will continue to endure deployments that are longer than our goal of 6 months, and the time between deployments for a significant number of ships will be considerably less than the 12 month target.

With the projected Base Force fleet of 450 ships, the Navy can sustain CINCs reaction requirements for continuous forward deployed carrier battle groups, amphibious ready groups, surface combatants and attack submarines in two theaters simultaneously, with the ability for partial support in the third. The 450 ship fleet will support the CINCs in carrying out national tasking whenever their requirements increase, just as the Navy has always done, but it comes at the expense of more time at sea for our sailors and major disruptions in maintenance management and family life. Even at today's force levels, whenever we have to surge as we did in Southwest Asia, it normally takes considerable time for us to return to normal deployments. This is happening now as we determine how to disengage and reestablish stability in the region. For the same crisis scenario, the "people" stress would obviously be greater with a 450 ship fleet than with the 550 ship fleet we have today. In the past, this stress has adversely affected retention, maintenance and fleet readiness.

THE WAY AHEAD

The naval forces of the United States have adapted rapidly to the dramatic changes of the past year—and stand poised in anticipation of changes yet to come. The fleet that U.S. taxpayers provided over the past decade has served us well. With

a useful service life of up to 40 years, the bulk of these ships and planes will still be with us, forming the backbone of the fleet, well into the new century.

As we anticipate the changes and challenges that lie ahead, our efforts will be focused on several key areas:

- *Training and education*, because our people are our primary force multipliers. Our sailors can be replaced only with the greatest difficulty, and, at current levels of quality and readiness, they can't be duplicated in the forces of our adversaries . . . at all.
- *Joint and combined operations*, because they generate the greatest combat capability in the shortest time.
- *Forward engagement*, because it is the key to successful implementation of a global deterrent strategy.
- *Surge capability*, because a premium will be placed on projecting adequate combat power rapidly to the scene of action, should deterrence fail.
- *Deployment flexibility*, because we must make adjustments to get the job done with a smaller force.
- *Technological superiority*, because the battlefield is the worst place for Americans to come off second best.

We must ensure that, as technology evolves, we employ it to our best advantage, and have the capability to counter developments by others, if required. The technological gap between our systems and those of potential adversaries most likely will narrow, but we must never lose the lead. Desert Storm demonstrated that having the technological lead can save lives on both sides of the conflict.

We must match technology to the battle space of the future, keeping in mind that many of our platforms will spend three or more decades in active service. Low observables, improved weapon systems, remotely piloted vehicles, netted high-speed computers, and multi-dimensional electronic warfare and command, control, and communications systems are some of the promising areas we are actively exploring.

An affordable technological advantage is essential to successful implementation of our national strategy. The fiscal realities of the 1990s have made affordability a dominant factor in sustaining our maritime strength. To meet this challenge, we have initiated a top down Total Quality Leadership approach throughout the Navy and Marine Corps. Our goal is to strive for continuous improvement, in order to provide the best affordable mix of forces and capabilities and to maintain those forces in a high state of readiness, able to get the job done right the first time.

SUMMARY/CONCLUSION

New developments, as dramatic and unforeseen as those capturing our attention and imagination over the past year, surely lie ahead. Our nation's leaders will find naval forces as useful, necessary, and important as they have been during the 215 years since the founding of the Republic. In peacetime, crisis, or conflict, naval forces will continue to serve our nation and national leadership by providing a wide range of military options, from diplomatic representation to massive retaliation.

Naval forces have a tactical agility, mix of capabilities, and staying power unique to our nation's armed forces. Independent of political access or foreign bases, they have the capability to act swiftly and decisively anywhere in the world—through unilateral action, U.S. joint operations, or as part of a coalition of allies.

Future large-scale regional deployments, like Operation Desert Shield/Desert Storm, will undoubtedly be joint service or coalition efforts. U.S. Naval forces, complementing and enhancing the capabilities of the other services and regional allies, will serve as enabling elements, making possible rapid and effective concentration of military power to influence events ashore or afloat.

As we adjust to the geopolitical and fiscal realities of the present and prepare for an uncertain future, the task before us is to avoid relearning the lessons of the past. One thing certain about this future is that the United States will still require a Navy and Marine Corps of sufficient size, quality, and capability to ensure freedom of the seas, to maintain regional peace and stability, and visibly represent our interests wherever they lie.

Senator KENNEDY. Thank you. Admiral Kelso.

STATEMENT OF ADM. FRANK B. KELSO II, CHIEF OF NAVAL OPERATIONS

Admiral KELSO. Thank you, Mr. Chairman, I appreciate very much the opportunity to appear before your committee this morn-

ing. I know that you believe, as I do, that naval forces are vital to the security of our Nation, and we all have great interest in where we are going in the time ahead.

I think this past year has shown us once again what our naval forces mean to us in both a strategic and a tactical sense. It has been our Nation's strategy to maintain forward deployed naval forces throughout my entire career and much of the time since the end of the Korean war because we felt it was in our interest. That gave us the opportunity in the Persian Gulf to provide early sustainable power. In less than one week after Saddam Hussein attacked Kuwait, we had two carrier battle groups in striking range of Southwest Asia. It allowed us to quickly deploy a Marine Expeditionary Brigade with a maritime prepositioning ship providing 30 days sustainability on the ground.

Also, in this year, we had Marine and Navy personnel off of Liberia for some 7 months removing not only our own people, but other people who were in harm's way in that difficult situation there. We took our Embassy personnel out of Somalia during Desert Shield in an amazing 400-mile trip by refueling helicopters over water. Not only did our people come out, the Soviets who were caught with them in that strife came out too.

We are today providing support for the Kurds in northern Iraq, not only with Marines on the ground, but with carriers standing by, et cetera, to support any necessary air support they might need. In the aftermath of Southwest Asia, the Marine Amphibious Ready Group, on its way home spent about 3 weeks in Bangladesh to provide the capability to move provisions and supplies to people who were in distress as a result of a disaster there.

That is fundamentally what our capability is and what it has been for most of my career. I cannot see much change in our need to be able to do that. We are the only nation in the world that can do it. That is the sort of naval forces and marine forces we have provided over the last year.

To talk about sea control for a minute, we tend to forget what sea control means to us as a nation. Not for one moment during the Southwest Asia conflict did we ever think about losing any merchant ships going to the Persian Gulf through enemy interdiction. And yet, we moved more supplies there than we have ever in so short a time—four times what we moved in Normandy in 1945. Only one black hull—merchant ship—would not go into the Gulf. The reason all the rest would go into the Gulf was because there were grey Navy hulls that they knew would take care of them—there were no enemy forces to interdict them.

We were able, because of this capability, to provide maritime interdiction operations almost instantly to stop seaborne trade to Iraq when the United Nations passed a resolution to do so. This particular operation continues today because the embargo requires that we not permit weapons and defense materiel to go into Iraq. We are continuing that operation.

Senator KENNEDY. Just on that point, are they trying to bring in any materiel?

Admiral KELSO. I have not seen any indication of any coming in. We stop and inspect all ships. Generally, the inspection is because we are not sure what is on a given ship, so we have it stopped and

move the cargo so we can see what it is. I do not recall any recent violations. It is working so well that they are not getting any seaborne munitions in there.

I think we are probably the only nation in the world that has the kind of capability to do that. To put it in perspective for you, in the West, the next navy of any size has fewer than 100 ships. The next one has a little less—between 90 and 100—and the rest are not even in the ball park. We provide the capability and the catalyst to make things like the embargo happen.

I might also say that the exercises that we have done with our allies over the years were very important during this operation because the coalition navies could quickly come together and operate effectively as a result of that earlier training.

I think as the world changes, we will not look at the idea of a global war scenario, as much as we have in the past; clearly I agree that that scenario, that risk, is much less. The idea of power projection with naval forces will take on added importance, because if we are talking about a Third World conflict scenario, it is going to be a conflict scenario that deterred best I believe, if an adversary perceives that we have the ability to project power quickly, and that they believe forces are there and can be used. I think it will become very, very important.

We also found that some of the decisions we made in the past continue to be borne out; that if you look at the sortie rate from carriers during this war, for example, you will see that the *Teddy Roosevelt* stands out at being able to produce more sorties in the war than any other of our carriers over there. She was the only nuclear carrier. Our idea to build nuclear carriers makes sense.

Many of the scenarios made possible in this war are not likely to occur in other areas of the world. I do not know of any place else in the world where you have the kind of infrastructure you had here, to fly from many airfields, port facilities where you could bring in enormous numbers of ships in and off load them quickly. It is the only place in the world I know where you get free fuel and water in the desert. We have to remember that. [Laughter.]

I think we made a good decision in years back when we decided to distribute our firepower across our ship classes. We were able in this conflict to deliver the cruise missile from all types of platforms from all directions. The cruise missile, itself used for the first time in combat, showed its capabilities. I would like to remind you that the conflict is over, and we are thinking about coming home. But, if I compare the ships I have devoted to that area of the world, on August 2 it was six; it is 42 today. I am not sure when that mission will end in that part of the world.

The other thing I would like to say is that as I travel across the world, particularly in the western Pacific, and having worked in the Mediterranean for a while, I find most of the people in the world are pretty happy that we are there. They understand that it is in their interests that we are there. They see us as an honest broker, and that we provide much stability in the world. I was in Australia no more than a month and a half ago, and there was an absolutely clear message from the top to the bottom—how much they appreciated our presence. They worry about what is going to

happen to the U.S. Navy in the years ahead as we reduce our budgets.

Senator COHEN. Is it the same sentiment in New Zealand?

Admiral KELSO. I did not get to New Zealand, but I think it might be the same, sir, if I did. There might be a little more discussion on some other issues.

I guess, Senator, what I am trying to say is that, in my view, what I call maritime superiority is what I sought to try to describe to you this morning. It is vitally important to this Nation, and in my view, we are the only nation that has it. No other is even close. It is a heavy burden because we are a capital intensive service, and I do not think that is going to change. It never has changed. We are not going to be able to build some cheap mix of ships or some small numbers of ships that can do everything.

The world is still 75 percent salt water, and you can only be in one place in one ship at one time. That is not going to change. I do agree that the ships that we have today are far more capable, and when amassed together in small areas, they put out more fire power.

In a sea control role, it is a big ocean. As a maritime nation, we are becoming more dependent every day on our economic lifeblood to use the ocean to support our interdependence and trade with other nations of the world. We are becoming more and more dependent upon resources from overseas. It seems like that importance is not going to diminish in the years ahead of us. I think it is an extremely important question as to where we in this Nation are going and what we are going to have for naval forces in the year ahead of us. I very much welcome your interest and support in this area. Thank you.

Senator KENNEDY. Thank you very much, Admiral.

You are absolutely right with regard to the interdependence on trade. We have to protect the Suez Canal, the Panama Canal, the Straits of Malacca, and the Straits of Hormuz. International security and international trade are in many respects very closely interrelated.

Yet, our allies are not yet prepared to help and assist in maintaining that kind of security. That is another issue for another time.

Let me just ask you this first. Mr. Secretary or Admiral Kelso, do you have any major disagreement with the assumptions of the results of the CBO analysis?

Mr. GARRETT. Mr. Chairman, I personally have not had an opportunity to review this. I only just received it.

Senator KENNEDY. Would you give us a response and file those as part of the record?

Mr. GARRETT. I certainly will.

Members of my staff were afforded the opportunity to go over and review the statement and I was briefed on it quickly yesterday.

Senator COHEN. Would you explain why both of you seemed to pale as the CBO analysis was given to the committee? [Laughter.]

Mr. GARRETT. I did not realize I did, sir.

Senator COHEN. I thought I detected a gasp.

Mr. GARRETT. I certainly agree with the opening conclusion that the years ahead are filled with uncertainty. I do not take issue

with that. I think it is a valid observation. It is one that we have been dealing with. I think the debate, at least as far as I am concerned, began a long time ago. I have been involved now for 5 years and, obviously, it will continue. It is a debate that we have to have. As the CNO points out, it is a vitally important issue to this Nation as we move into the future.

I think, however, that I would have to take issue with the overall conclusion of the CBO study as it was briefed to me. I will review it in detail and get back to the committee, if I may.

[The information follows:]

My view of the future is not nearly as bleak as the picture portrayed by CBO. I heartily agree that the future threat and economic conditions facing the country are very uncertain but I am equally convinced that a Navy of about 450 ships is both affordable and necessary to maintain our country's military and economic security through the decade of the 1990s.

The results of any analysis are greatly determined by the initial assumptions. CBO chose to treat operating and infrastructure costs as force structure dependent without provision for changes in operations. We are examining possible revisions to deployment patterns and fleet operating cycles for the future, which have the potential to create substantial savings. Several efforts are underway to review our industrial operations and shore support establishments for consolidation, efficiencies and savings. Additionally, the unit procurement costs used by CBO for several types of aircraft are well in excess of today's contract costs for the same aircraft.

The conclusions offered by CBO are somewhat consistent with what we see as being the approximate required investment level for the Department of the Navy in the near to mid-term. Based on the current Future Years Defense Plan, the Department of the Navy budget will have dropped by almost 28 percent in real terms during the period fiscal year 1985 through fiscal year 1995. CBO suggests that the Navy of the future will require between 1 to 3 percent real budget growth between 1995 and 2010. Our examination of the CBO report leads me to believe that the correct answer is much closer to the range of 1 to 2 percent. When the CBO-estimated range of required Navy outyear budget growth is compared to the 3.8 percent real Gross National Product growth, projected in the 1990 Omnibus Budget Reconciliation Act, it can be concluded that the Navy can maintain the planned force structure with a budget that grows at a rate substantially less than that projected for the Nation's economy.

Naval missions have been and will continue to be prioritized in the formulation of our programs and forces for the future. It is an ongoing effort that started decades ago with constrained budgets and budget projections. We will continue to analyze the potential threats to national security in a rapidly changing world and make adjustments accordingly.

Senator KENNEDY. The overall conclusion being what?

Mr. GARRETT. That we cannot sustain the 450-ship Navy given some of the study's assumptions as I understand them, which do not take into consideration those on-going efforts alluded to by Senator Cohen.

Some of those efforts include the base closure process that we are engaged in—a very, very difficult process—which attempts to remove overhead from the cost of doing business on the part of the Navy; our attempts to selectively modernize platforms that allow us to provide more capability with fewer numbers in the future; the possible revisions of some of our operating policies as they have existed—our deployment patterns, our fleet operating cycles; the continuing examination of industrial operations in our shore support establishment to achieve consolidation and increased savings. It is, as I said, a very, very intense review.

I know the CNO is doing this on a continuing basis with our modernization programs, based on the changing threat and requirements as we see them.

All of these, hopefully, will produce cost savings as we move into the future. I cannot disagree with that if, in fact, the budgets continue down on the slope that they are currently on, that the Navy will be smaller. What we have been trying to do is devise methodologies to maintain the greatest capability within the Navy and the Marine Corps while living within these fiscal realities.

Senator KENNEDY. For me the key question is whether you are going to try to keep every ball in the air or whether some leader in the Navy is going to have the range of different options restricted. Maybe this is just going to go on. You are going to get all your savings.

The base closure and some of the other CBO studies show that it is actually going to cost more. You talk about cleaning up the Watertown Arsenal, the concept has to go forward. There will be some in my State. Most of them will be closed in any event, but there will be some in my State and some in others. It has to go forward.

Realizing in the short run that substantial savings is not something that I have seen a great deal of evidence of.

With deployment, I do not see how you are going to alter or change your deployment mechanisms in terms of having those ships abroad or overseas for a longer period of time. It has been a very compelling case, at least what has been evident to me over the time I have been on this committee, particularly these aircraft carriers and others on station for a certain period of time, and after that you really have a very adverse impact in terms of family, morale, and a variety of other kinds of issues. In terms of consolidation of shore establishments and changing requirements, there may be some squeezing out.

The issue that I was interested in hearing you out on is, say you go to 12 aircraft carriers, do you need them all the way they are configured in basic battle groups now to deal with the Soviet threat?

Certainly you are dealing with some sophistication and importance of its location in terms of weapons from the Third World. No one is minimizing the capability of China and Brazil and other countries to produce very important and significant kinds of intermediate missiles. The French and other countries produce missiles, obviously that can be threatening.

If we have 12 aircraft carrier battle groups, do you need them all to be designed and configured the way they are at this time, or do you have six at the present time that are configured to deal with the Soviet-kind of threat, until you have a clearer idea?

Do you try to think about what the other six might look like in dealing with Third World kinds of situations? What are the tradeoffs on that? Do you need all of those ships in the battle group, or do you need different kinds of capabilities for different ships facing the kinds of missiles and weapons systems that these Third World countries have?

This is the kind of thing that at least I am interested in hearing out. If you are not going that way, why are you not going that way? Admiral Kelso.

Admiral KELSO. Senator, we are already making those kinds of decisions. As we look at the issue of how many ships we are going to have in the years, there is a fundamental belief that our com-

mitments will not change much. We will continue to maintain a forward presence at various places in the world, and we must retain, in my opinion, the same capabilities we now have to respond to crises as they occur. If you are not there when the crisis begins you have to respond in a different, more difficult way than if you are on the scene from the beginning.

If you looked back a year or two ago at the composition of the carrier battle group in the Mediterranean, you would see that it had a certain mix of ships that we had decided upon. It was so many cruisers, so many of this kind, so many of that.

If you look at it today, it is a vastly different mix. It is down from nine to six or seven ships today. If you look at the one in the Persian Gulf, it is down to five.

Senator KENNEDY. That would be very helpful.

Admiral KELSO. In order to be able to have the commitments that I think we are going to meet, you are going to have to have a smaller number in the same places where you might have had more before.

You are also going to have to operate in a more flexible way. Let me give you an example that is real-world.

In 1978 when we decided to increase carrier presence in the Indian Ocean as a result of the hostage crisis, the commitment was to an additional two carrier battle groups in the Indian Ocean. We had 13 carriers at the time. We made that commitment for about 2 years. I can plot for you the downward retention rate for most ratings that made those deployments because they were gone for long periods of time and did not come home for very long.

We had two carriers in the Mediterranean at the same time because we were wed to an idea that we had to be in a position to deal with a Soviet conflict.

Today, I think, we have a greater flexibility. Now, if we look at what happened in Southwest Asia when the war became hot, we moved the carrier immediately from the Mediterranean to Southwest Asia. We moved the carrier that was working in the Western Pacific to Southwest Asia. We did not replace either one of them until the President decided we were going to war; then we surged four additional carriers to do that.

We are going to have to operate more flexibly in order to take the load off the backs of our people.

Having said that, coming out of this conflict, it is going to take us a while to come back to the operating tempos we had planned on initially. In fact, we had planned on taking the *Forrestal* and putting it in Pensacola to start training aviators. We made an extra deployment with it to try to get the turn around ratio for our carriers down more quickly so that there would be less wear on our people.

We are already making decisions like that.

You ask about the mix on the carriers. I think we are in a position today, sir, where we have the airplanes that we need. You could have some different view 10 years or 20 years from now as to how you would need to mix them based on future requirements. For now, we have the ones that we need for any near-term conflicts.

I think you will see that the capability a carrier has, in both strike and sea control and associated missions, gives you the option to put it anywhere and to do the job you want.

If you are going to forward deploy them, you need to be able to move them on short notice when required. Whatever the job is, you need time to move a carrier that is differently configured, and time to initiate the logistics support for it. You complicate the logistics problem when you have too many aircraft mixes on different carriers. It does not necessarily become cheaper for you.

Senator KENNEDY. Let us look at what existed in terms of ship force goals and then at what Secretary Cheney said with regard to the aircraft carriers. He has talked about 12. The Navy wants something beyond that, but let us just look at what the Secretary said.

We have gone from aircraft carriers at 15 to the 12 that Secretary Cheney talks about. Attack submarines, before it was 100, Secretary Cheney talks about 80, which is a 20 percent reduction. For fleet size, there has been about a 25 percent reduction.

You have about 20 percent of attack submarines and fleet size is down to about 25 percent in terms of projection. Now you go on the goal for the amphibious shipping has been cut since the last budget from one Marine Expeditionary Force plus one Marine Expeditionary Brigade, or MEF plus the MEB, to a goal of 2½ MEBs. You believe that the budget reflects a shift in emphasis toward the Third World, when the amphibious lift has been cut by 40 percent and the other goals have been cut by 20 percent to 25 percent.

I am interested in the substance of that, the reasons for it, if we are thinking about the Third World.

Second, I think generally people get a sense that we are just going to have across-the-board cuts. We are going to have X cuts for the Army, X cuts for the Navy, and X cuts for the Air Force. I think for all the reasons that Senator Cohen and you have played, the Navy is going to get short shrift because of the necessity in terms of projection force, which the other services cannot match you on.

My concern is that if everybody is taking the cuts and people say, look, the Navy is being cut by 20 percent, 25 percent, maybe 30 percent or 40 percent in this other area, the Air Force is doing the same, and the Army is doing the same, the big loser is going to be the Navy.

You may differ with me on it. I think that we have to be able to demonstrate with the changed world conditions that the Navy needs to have both the flexibility in dealing with the continued production of Soviet submarines and whatever they are doing in terms of modernization of the rest of their fleet. Then, there are additional kinds of needs that we are going to face in terms of projecting power, potential loss of bases overseas, and particularly operating in hostile climates under very, very difficult circumstances which are different from the Gulf, but where we may not have the kinds of basic infrastructure which you have both identified.

I am interested in the general observation, but also with regard to what has happened in terms of the cutting of the amphibious force.

Admiral KELSO. Let me take that on, sir.

First of all, I see this as an entry process. We do not have a clean sheet of paper to start and write from. You have to start from what you have.

A decision was made that we were going to have a lesser amphibious capability after the cut. The attack submarine issue is a little different. If you look at what we are building in attack submarines today and what we are projected to build, it will not be very long when we will be well below 80 attack submarines. The fact that we have 80 attack submarines is because we have them and have built them. The price goes into them when you build them. They do not take a lot of people to man them, and they are reasonably efficient to operate since they are nuclear fueled. In fact, it costs me six times more to get rid of one than it does to operate it for a year.

It did not make much sense to throw away the capability that this country had built when we already had it. On the other side of that coin, I would say that, in my view, the attack submarine with a Tomahawk cruise missile certainly has a power projection role in the world ahead of us. We worry about the things that makes ships vulnerable today.

I would compare it to the SSBN when it was the first strategic platform. It was just one of many strategic platforms. Today, I think, many people would agree that because of its survivability and the fact that technology has allowed you to build a very accurate missile, you do not hear many of the old myths about it anymore. It is regarded as a very important part of our strategic arsenal. I can have the same vision for the attack submarine with a cruise missile in many scenarios.

I do not know what the real number for attack submarines is in the years ahead as we iterate this, but I know what it is going to be at the rate we are building them today. It is going to be 30 in a few years, because we built only one a year and the 688's will all pass through their lifetime, unless we go on and build another submarine. I think we need to look at that. I think we are going through an iterative process here. All of these platforms and systems have a thought process that you have to go through.

The CBO talked about airplanes and that we would have to look at replacing airplanes.

I made a decision yesterday to change the number of S-3s per squadron from eight to six, because I knew by doing that those S-3s would be available for us longer because we would not fly them as much. That was against the advice of our fleet commanders. I was looking at how we were going to do that.

There are a lot of decisions like that ahead of us as we go through this period. It is going to take that kind of thinking to maintain the levels that we need.

Senator KENNEDY. Just before yielding to Senator Cohen, what about the reduction in the amphibious capability? What is that against the background?

Mr. GARRETT. Senator, I will give you my view of what we are struggling with as articulated so precisely by Admiral Kelso.

The structure of our Naval forces is a very delicate thing. There is a very delicate synergism between all of its parts—between its logistics, operations, and combat, its people, and infrastructure. That is what we have been looking at now for 4 years as we have

continued to experience decreasing TOA while trying to maintain an effective naval balance. Because, if that delicate synergism gets out of balance, then you really do start to negatively impact capability.

Concerning the 2.5 MEB decision, our goal, as we worked toward putting the 1992 budget together, was initially for three MEBs. That was an affordability decision, as have been so many of our force structure decisions. Clearly, affordability overlays the problem of trying to maintain this great capability which, as Admiral Kelso points out, Congress and the American people have bought and paid for, a capability which in my view, is vitally important to the Nation. We are looking at other ways of enhancing our ability to move forces—our primary and premiere insertion forces, the Marine Corps—into areas in which we may find ourselves involved in the future. But, essentially the 2.5 MEB decision was driven by affordability. I am not sure that we will not revisit that as the debate continues, as we put the POM together for 1994 and the outyears.

It is critical, I think, for us to understand, as the CNO points out, with the operational requirements put upon us, if we are not flexible we will stress our people, as we have before, and they will elect, in this all volunteer environment, not to continue to serve. Without them, obviously, the debates that we get into about more cost effective weapons, smaller or larger numbers, etc. become somewhat irrelevant.

Senator KENNEDY. Thank you. Senator Cohen.

Senator COHEN. Thank you, Mr. Chairman. I am not entirely clear whether there is a coherency between the Secretary and the Admiral in terms of their views of where we are going.

Secretary Garrett pointed out that we are going to be reducing necessarily and the threat from the Soviet Union is down somewhat. Admiral Kelso, I think you put a different emphasis upon it. I think it was Bismarck who said there are only two things in life that don't change, one is history, the other is geography. And your emphasis was upon the geographical change.

Senator Kennedy might point out that maybe one thing that might change would be the future. Yet, peering into that future it still becomes very difficult to say how we ought to structure our Naval forces in order to prepare for whatever that might bring.

I have quoted this before, but George Will once said, about one of our former colleagues, that he looked as if he had his clothes tailored while standing in a wind tunnel. He actually meant it as a complement.

Senator KENNEDY. Was it said about John Warner?

Senator COHEN. Oh, no. Nor about the Chairman. [Laughter.]

That image has stayed with me because here we are in a wind tunnel of change, and now we are being asked to tailor our forces to meet the future. It is very difficult to do. It is not impossible, but it is very difficult to do.

Admiral Kelso, you have indicated that we are becoming more interdependent economically. Free trade is something that we are promoting as a policy on the part of the United States. Free trade, certainly, with Canada, with Mexico, with Europe, perhaps with the Eastern European countries as it may unfold. One of the para-

doxes is that the more interdependent we become economically, the more vulnerable we become. Because the moment that our economic prosperity depends upon goods and resources coming from other parts of the globe, the more vulnerable, the more fragile our prosperity actually is and the fewer capabilities an opponent needs to interrupt that.

We are locked into this inherent paradox; as we are pursuing peaceful objectives and, we hope to have a New World Order, our own stability and economic viability becomes that much more tenuous and fragile and in need of greater protection.

You also pointed out that we had an unusual situation in the Persian Gulf. We had free fuel and free water. We had dock facilities. Maybe those will be there tomorrow and maybe they will be there next year, but I read just this week about elements within Saudi Arabia, where the Islamic fundamentalists were demanding a greater role and voice in the Saudi government.

Now even though we are popular today for having done what we did in the Persian Gulf, it does not mean that that popularity will sustain itself. Popularity has a way of shifting rather quickly, depending upon who happens to be occupying the seats of power. What might be popular today might be anathema tomorrow, depending upon changes in direction in those countries that are in a state of rapid change.

Subic Bay might be taken out by a volcano as opposed to an insurgency in the Philippines. There is a host of contingencies out there that we have to cope with. It poses a dilemma for all of us.

I am sorry the Chairman is not here at this moment, but he raises a good issue, the equity argument. One line of reasoning says just treat everybody across the board equally, the Air Force, the Army, the Navy; all get a 20 percent to 25 percent reduction. Now, we can deal with these equity issues in terms of individuals. If you take people who are similarly situated and you treat them differently, that is normally considered being a denial of due process or equal protection under the law. But there is a converse argument. If you take people who are not similar and you treat them equally, I think that is also a denial of equal protection.

If I apply that in a strategic sense, if you take a service which is not similarly situated, and you treat it like every other one, if your missions and goals and responsibilities are different than those of another service, but you treat that service equally across the board, it sounds equitable. It can, in fact, be quite dangerous. It can, in fact, not be a denial of equal protection, but a denial of national protection in a very fundamental way.

We have got to resist that notion that we are just going to have a nice, clean across the board cut, where everybody takes a 25 percent reduction. If we are going to really look at this analytically and we should ask, what are the roles, responsibilities, and missions that we are giving to our respective services.

That is an argument that we have to contend with, and we are going to need your help in order to make those kinds of arguments.

Admiral KELSO. Senator, I would like to say that I certainly believe that we have to have some balance in our Navy. I think we are going to have to make some tough decisions like that, even within our own house. I contend that we are making some of those

decisions already. As I have said, we do not start from a clean sheet of paper. We have enormous investments this country has made and an enormous capability today. We have to remember that there is a reconstitution issue here.

As long as we can maintain that—since we are such a capital-intensive service—we should hold on to those investments when it makes monetary sense and military sense to do so.

Senator COHEN. I agree with you, Admiral.

There is the other issue, of course. We are getting smaller and with individual ships that are perhaps more capable. But, we have to consider the issue of surge capability.

There is a big difference between a Patriot and an aircraft carrier or an Aegis cruiser-destroyer. We found out even in the Persian Gulf that we did not have much of a surge capability to produce Patriots. They did an extraordinary job at Raytheon, in really increasing their production line. We had no idea how many Scud missiles Mr. Hussein had. We still do not at this point.

We are not going to have a surge capability in shipbuilding. With this notion that somehow we are going to be getting down to one yard, et cetera, we are not going to be able to build those ships in a time of need.

Mr. GARRETT. Even if you maintained the yards.

Senator COHEN. Even if we have two yards, it is not going to happen.

Mr. GARRETT. As Mr. Hale said, if you shut down the yards, they are going to go out of business. Then you must make a tremendous capital investment if you ever want to build again in a similar or equal yard. I am not sure that the American people or Congress are willing to make that investment up front. That is one of the concerns that we have, as Admiral Kelso points out, regarding our ability to reconstitute.

I agree with the Admiral. We are not talking by one another. I think we are together on the philosophy underpinning what we are doing. We are making some of those very hard decisions, Senator, in the context, for example, of taking out the entire class of 1052s (FF-1052). Those are ASW platforms that were primarily designed to protect shipping. That is in recognition of the changing world as we see it. But, we are taking them out in a way that if necessary we can reconstitute and bring them back.

The same is true of the *Forrestal*, as the Admiral pointed out. We are converting her status from an active, fully operational fleet carrier to one of training Naval aviators. We will retain the capability, if we have the time, to convert her back to a full up round, if we were to find ourselves in that kind of world situation.

Those are the kinds of decisions that we are making—trying to keep the equation in balance so that we do not break something that may prove vital to us in the future.

Senator COHEN. Admiral Kelso, there are three platform sponsors, air, surface, and undersea warfare. They routinely compete for an ever-diminishing share of the budget. Is OPNAV, the structure itself, suited to resolving these kinds of budget differences between the contending communities?

Admiral KELSO. I think so, Senator. I started a program where I personally meet with all of the three-star leadership in OPNAV,

and we talk about the issues across the Navy. We have been trying to follow some of Mr. Demming's principles of how to plan and look forward and to cut across the stovepipes and the sort of things that have, at times, hindered decisionmaking and made it unclear what was good for the whole rather than for the individual.

We are trying very hard to make sure that we look for decisions to provide to the Secretary, recommendations that are good for all of the Navy. I think it has been a learning process for all of us. I tell you, we have a lot of people who have a lot of honest views about different things, so there are a lot of differences in those discussions that I think are healthy, but they have to be talked out, and we have to come to a consensus.

It is very hard sometimes to get a consensus in areas where we have divergent views. We are trying very hard to do that. I am doing the same thing with the fleet commanders and our systems commanders to make sure that what we are building and taking care of can be inter-operable with our sister services, as well as with each other.

Senator COHEN. A few weeks ago, Vice Admiral Arthur testified and commented very favorably upon the Magic Lantern for the use of helicopters in detecting mines.

What is your assessment of that?

Admiral KELSO. I would like to see the results when we have finished. I think we will probably get the best test of minesweeping right now that we will ever get for a long, long time because the Iraqis laid well over 1,000 mines. We are at maybe about 80 percent of having gotten rid of them. We are trying to get the Persian Gulf back to where you can sail a ship anywhere and be fairly safe.

To do so, that platform is over there. We have the newest mine countermeasures ship, the MCM, that we have bought; it is over there operating. By the way, the sonar on it has been working, doing its job fairly well.

We have a German system and a Swedish system. The French are there. The Belgians are there. We are getting a look at fundamentally all the technology that exists today in the Western World to both hunt and destroy mines.

We are also looking at what we have been doing. I went back and did a little research on the history of mining and found out that just about every era and time when we needed minesweepers, we had the same problem. The problem is that generally we were not organized very well for it. We did not have the right command set-up, so we did not have them together to train together. That may be as much of an issue as anything else.

I think we are learning an enormous amount here. What we are going to do is to put that together and try to solve those problems.

I do not believe the major issues will be technical. I believe there will be more things that we learn on how to take care of mines better. It is just a fundamental problem. If you have to find 1,000 mines, you have a tough problem. That is what happened in this case. We are dedicated to try to improve our capability in doing that.

Let me put another thing in perspective for you. When we went into Normandy in 1945, we had almost 300 minesweepers who swept for 24 hours, eight lanes, 10 miles wide, to get us into Nor-

mandy. It takes a lot of assets if you want to sweep mines in a hurry to go in there. I think we lost something like 40 vessels to mines during that period of time, anyway.

That part of mining has not changed much. It is hard to deal with. I think we are getting a good look at the best technology that is available to try to tell us which way we should go.

Senator COHEN. Not only in locating, but in destroying?

Admiral KELSO. Destroying, also, because it is very important to be able to destroy.

Senator COHEN. A time consuming process, the way it currently is structured.

Admiral KELSO. We have a system that we are working out there now that delivers a charge to the mine and destroys it. We will get a good test of how that works, too.

Senator COHEN. Without the divers?

Admiral KELSO. Yes, without the divers.

Mr. GARRETT. As the Admiral points out and I have tried to point out in my opening statement, we consider this a real priority.

We are learning very, very valuable lessons as we continue in the Gulf. We do have the system you mentioned, of course, in competition with another system. We are weighing the gains and benefits from both. We will make a decision at the appropriate time as to how to proceed. There are other very important systems, as the Admiral points out, that we are also investigating.

Senator COHEN. Admiral, what is your position regarding an increased role for women in Naval aviation?

We are going to be having hearings shortly about expanding the opportunities for women in combat. What is your assessment of women in Naval aviation? We know that they currently serve aboard transport ships and logistical supply ships. What about combat ships?

Admiral KELSO. Well, as you know, Senator, throughout my career we have continued to increase the positions in which our young women serve within the Navy.

We have gone from none on ships at all to the point where we do have women on our supply and repair ships, and on many of our support ships. I was in Norfolk when they instituted that program. I think it is working very well.

I think the Secretary's position is that we will be happy to work with the Congress, with the law. I think the Department and the Secretary, whatever the goals, would like the capability to be able to choose where people are used and how they are used, to best give us the combat capability that we need in the Navy. We will work with the Congress on this, sir.

Mr. GARRETT. If I may, Senator Cohen. I was the Under Secretary when we did the study in 1987 to expand the billets available to our young women in the combat logistics force ships and the VQ squadrons.

As the CNO points out, over my career as well—since 1961—we have steadily expanded the role of women in uniform. We have always defined that role based on existing law and mission requirements. As the law has changed, so has the role of women.

I think we have been very successful in increasing the number of career fields. We have succeeded in that regard because we have

provided proper training to support career progression in the combat readiness aspect of the Department of the Navy.

Through the CNO and the Department, those roles have been expanded after very careful study on the effects of combat readiness, career progression for Navy women, and I believe that must be the case in the future.

If the law is changed to permit women to serve in combat, then I think the service Secretaries or the Secretary of Defense should determine what additional roles are appropriate based on individual capability, combat readiness, and the operational requirements of the individual service.

Senator COHEN. My time is up, but let me just ask one more question, about redundancy.

The Navy along with all of the other services, maintains two separate legislative liaison organizations: one that conducts liaison with the appropriation committees and one for the rest of us lesser mortals on Capitol Hill.

Now is this an optimal use of resources on the part of the Navy, or is this something you have inherited? Is it something that you think ought to be changed?

Mr. GARRETT. It is something that I inherited. It is something that I am looking very closely at as we move into the future. I am not sure that it serves the best purposes of the Department, but I am not sure that it does not. I can assure you, Senator, that I am looking very hard at this issue.

Senator COHEN. Thank you, Mr. Chairman.

Senator KENNEDY. Thank you. Just to come back to women in combat—as I understand, the statutory law bars women from serving as pilots, navigators, and crew members aboard combat aircraft in the Air Force, Navy, and Marines. The law also bars women from serving aboard combat ships. There is no statutory restrictions on women in combat positions in the Army, but as a matter of policy, the Army does not allow women to serve in infantry, armor, artillery, or other combat units.

I am just wondering, with regard to the combat ships, Admiral Kelso, would you be for continuing the statutory prohibition of women serving on combat ships?

Admiral KELSO. I am sorry, Senator.

Senator KENNEDY. There is a statutory prohibition at the present time prohibiting women from serving as pilots, navigators, or crew members aboard combat aircraft of the Air Force, Navy, and Marine Corps. The law also bars women from serving aboard combat ships. Would you be for continuing the prohibition of women serving on combat ships?

Admiral KELSO. I could certainly live with the law as it stands today. [Laughter.]

Senator KENNEDY. Okay. Well, I guess the full committee is going to have a hearing on it next week, so we will have a chance to——

Senator COHEN. Could you live with it if it were changed?

Admiral KELSO. I certainly will live with the law, sir.

Mr. GARRETT. It presents, obviously—and this is the point that I was trying to make in reference to Senator Cohen's question—it presents the Navy with some very unique problems that the other

services are not faced with. I am concerned, of course. Because combat aircraft in the Navy, tactical aircraft, are obviously employed aboard combat vessels, if you, a fortiori, lift the combat exclusion, and that presents a wide range of issues for the Department of the Navy which the other services do not confront.

If, in fact, the decision is made to change the law, we can live with that. We can make it work. But it is very important, I think, that the service Secretary, whomever he or she may be, and the Defense Secretary have the opportunity to carefully study the effects on combat readiness—particularly the career progression issues as they relate to the seagoing services, and allow those changes to be made in a way that makes sense with respect to its impact on combat readiness.

Senator KENNEDY. Well, I think that would, certainly if it is changed, have to be the case.

Let me, Admiral Kelso, come back to the mine countermeasures. You highlight in your report that we need a robust U.S. Navy mine countermeasure. Mine warfare clearly proved to be an onerous problem for both the Navy and Marines in Operation Desert Storm. The Navy has obviously not had an opportunity to reflect on all the lessons learned in this budget.

But I suppose the question is, did we have to wait until the liberation of Kuwait to decide that Third World warfare would expose us to severe mine threats? It was only a few short years ago during Operation Earnest Will, the Kuwaiti tanker reflagging, that we learned the lesson that our mine countermeasure capabilities were deficient.

It could appear to the casual observer that the Navy was ignoring the earlier lesson in the fiscal year 1992 budget. You are requesting only two coastal mine hunters, rather than the four that were projected for fiscal year 1992 at this time last year. The budget also proposed to cut out the reserve mine countermeasure helicopter squadrons and rescind fiscal year 1991 funding for buying the newest mine warfare helicopters for them, the MH-53s.

Did we not learn enough from the Gulf problems? Do we have to relearn the lesson again in Kuwait?

Admiral KELSO. I think we understood much earlier than that that we needed to do something about minesweeping, and I think the argument, Senator, is if what we did was enough or not. We started trying to build a new class of ocean-going mine hunters and smaller minesweepers to sweep our own ports, and we are in a process of doing that. That shipbuilding plan that we put in had some modifications which went down as funding went down over the period of time.

But we are still committed to continuing to build that fleet—it is around 24 ships—and to modernize the older minesweepers, which we have. As I said, we are looking now at other ideas. If I fault myself or us, as much as anything else, it is because we did not do more about improving how we were organized and trained to use the assets that we have.

I think that one thing that gets confused in the mining business is this: if people are going to lay mines, you are not going to get rid of them easily. It takes a lot of time and assets to sweep them, and in this case, we have a lot of mines laid. We had them drifting in

the Gulf before the war started. I thought we were lucky that we did not have a ship hit earlier than we did.

I think that what we have to do now is, number one, as Senator Cohen brought up, follow up on the idea of Magic Lantern. Do we need to pursue that technology more?

As for the issues of the minesweepers in the Reserves, I think we changed our ideas about Reserves as a result of their superb performance in Desert Storm. We were having trouble manning one of the reserve minesweeper squadrons. The helos for the active fleet that we did not buy were bought instead for Reserve squadrons. Those squadrons are now in the process of being deactivated, so we probably need to look at that again to see if we would do it another way now.

I think there are a lot of decisions like that that we have to revisit, and we have taken that onboard, and we will work at it, sir.

Senator KENNEDY. Well, would you—given what we have learned over there in the Gulf, have cut those out, do you think now, in terms of the 1992 budget? Of course, that was set up——

Admiral KELSO. Traditionally, we have found that minesweeping is best done with a synergism of several platforms. Helos help because helos give you a good bit of confidence when you move a minesweeper in as to what you are looking for in various regimes or mining. So, I think we are going to find when we put it all together that the helos had a good effect.

If we do find that, then I think we will revisit that decision, Senator.

Senator KENNEDY. Well, you have two of the MHCs, rather than four, and you have also rescinded the 1991 funding for the newest mine helicopters, the MH-53s. That is a synergistic action, as well. Given the fact that this budget was structured prior to the Desert Storm and learning from it, why are we cutting back?

Mr. GARRETT. That question came up at an earlier hearing. We are looking, as the Admiral points out, at the lessons learned from the Gulf. I have been talking to some of our planners in the Department concerning the optimal employment of mine warfare platforms. Helicopters provide a very good platform, especially if they are in front of a ship or ships going in. But, there is a question, at least in my mind, as to the degree of contribution for the cost expended with respect to detection as opposed to clearing.

Of course, as the Admiral points out, in the synergistic mode where we have multiple platforms working together not just our own but those of our allies—it is a viable option. It was an issue which we confronted as we put the budget together. It was the basis of a decision, as the Admiral points out, to decommission two squadrons. Further, the legal advice that I received was that I could not spend those funds in the way for which they had been appropriated. We will continue to look at those issues, Mr. Chairman.

Senator KENNEDY. I am sure Admiral Kelso remembers when that tanker hit a mine over in the Gulf during Operation Earnest Will and then it had to go out there first and protect the Navy ships behind it. It was always something that sort of stuck in your craw, I am sure for all of us.

You talked about the lessons learned. Can you tell us what the lessons are that should not be learned?

Mr. GARRETT. Well, I think one of the lessons that I take away and that Admiral Kelso certainly has spoken to is that this ought not to be used as a paradigm for everything that is going to occur in the future. There were very, very unique circumstances that existed.

I have pondered where we are going to find like circumstances in the future in a Third World scenario; where you would have 30-plus modern airfields. The Saudis have overbuilt for years just to provide for this kind of contingency—eight first-rate ports that allowed the throughput of the 9 million tons of unit equipment and fuel and other supplies that went into that area of operations.

I harken back, of course, Senator, to my experience in Vietnam where we had one port. It was woefully inefficient for many, many months, impeding our ability to provide the requisite throughput.

I think this is a lesson that everyone ought to walk away from this situation with—that it was very unique in terms of geography, topography, weather, and the facilities that were available to us.

Senator KENNEDY. Could I come back just to the fast sealift technology? The committee obviously has been disappointed that the Department of Defense had chosen not to pursue the research and development effort on fast sealift alternatives more aggressively. It seems that the Navy should be interested in the program and obviously explore longer-term alternatives for filling the gap in being able to carry unit equipment and, too, to conduct technology studies that could have a payoff in warship or Navy auxiliary design.

Then, not unimportantly, to provide sea technology for commercial shipbuilding, and that obviously is not the reason for it, but if we are going to have to have to rely upon commercial ships to augment and supplement the whole effort in resupply, that there could certainly be an important spill-over in terms of technology base.

What is your own kind of sense about the urgency that you have now within the Navy in terms of being more aggressive on fast sealift?

Mr. GARRETT. Well, we again have learned some very valuable lessons in the evolution that is still ongoing. In fact, we continue to learn as we extricate all of that unit equipment from the area of operations. These are real-world lessons that we have learned, Senator. I have discussed these with Admiral Kelso and Admiral Donovan, who was responsible for managing the military sealift command, and TRANSCOM. As you know, there is a requirements study ongoing in the joint arena, the final review of which we are awaiting. Nonetheless, we intend to use some of the funds that were appropriated in 1991 and funds which may be available in 1992, if what I see occurring on the House side continues, to buy some more capable, primarily RO/RO ships, the roll-on/roll-off ships, with different engineering plants.

We do not train steam engineers any more out there. We are running out of them. We have to change, to some extent, the complexion of the Ready Reserve Force. We are looking hard at the options from a number of different proposals which have come in addressing this issue, as you point out, more aggressively.

Senator KENNEDY. Well, we will be following that closely.

Admiral Kelso, the committee appreciates the fact the Navy is moving forward on that aircraft carrier technology study. The committee took the lead in seeking far-reaching review to provide essential information with consideration of whether or not to build additional new aircraft carriers before funding of the next carrier becomes an issue in the budget.

This year, the Navy is requesting that the Congress authorize advance procurement funds for a new aircraft carrier in the fiscal 1993 budget. When will that carrier technology report be available?

Admiral KELSO. There are two studies, and I think you will have them in September, Senator. There is one by the National Academy of Sciences and one by the Center for Naval Analyses.

The Center for Naval Analyses has to look at the one from the National Academy of Sciences because the National Academy study is looking primarily at technology. The CNA is looking more at funding and ways to do it better. I think you will have them by September, sir.

Mr. GARRETT. The one by the National Academy of Sciences is presently before the Naval Studies Board, I believe, and we should be getting the report on it soon.

Senator KENNEDY. Are there any emerging conclusions from the study to date?

Mr. GARRETT. I have not been briefed on the study yet, Senator, but certainly when I am, I will communicate with you or your staff.

Senator KENNEDY. All right. How important is the ship design R&D funding for the next carrier in fiscal year 1995?

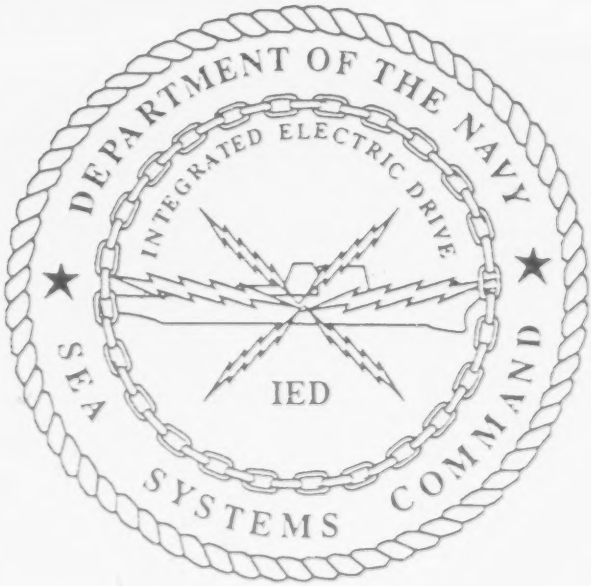
Mr. GARRETT. I think that will also be addressed in the study. We have been working on a rather solid design that came out of the late 1960s, the *Nimitz*-class carriers, and basically what we are doing is modifying them in some ways to account for real-world changes in technology—real-world changes in the availability of products that have gone into the carrier—and modified the design to accommodate them.

I think that those broader issues, however, will be addressed in either both or, certainly, one of the studies.

Senator KENNEDY. Admiral Kelso, the committee received the Navy's report earlier this year, March 1991, on the plans to pursue that integrated electric drive technology. Assistant Secretary Cann said, in his cover letter, the need for this integrated machinery system is clear.

[The information follows:]

PROGRAM PLAN
FOR
INTEGRATED ELECTRIC DRIVE SYSTEM



PROGRAM: PE 0603573N

PROJECT: S1314

Integrated Electric Drive System Program Plan

1. Purpose

This plan provides the top level strategy, schedule and funding for the systems engineering and component development of the Integrated Electric Drive (IED) System.

The funding for the IED System is supported in Program PE 0603573N, Project S1314.

2. Assumptions and Strategy

The strategy for the IED System is based on 10 points.

(1) There is no ship acquisition target at this time. Therefore there are no firm ship requirements and no ship acquisition pull.

(2) R&D budgets are getting smaller. In order to retain the breadth of technologies, the most significant cuts will be in advanced and engineering development.

(3) Maintaining the Navy's technical edge is critical. The challenge is to develop the technological foundation for our future ship acquisition programs. Since the characteristics of these future ships have not been determined, flexibility and the ability to keep options open are important characteristics of development programs.

(4) Battle force effectiveness is dependent on performance enhancements in future systems. Performance characteristics critical to the surface navy are outlined in OP-03's Revolution at Sea study reports and, in particular, the Ships Operational Characteristics Study (SOCS). The SOCS study summarizes the performance requirements for future surface ship machinery systems.

(5) Affordability is becoming increasingly important. Declining budgets mandate that cost considerations are now equal in importance with performance. The cost impact on the total ship and battle force will be the driver.

(6) There is a critically important need for advanced machinery systems. Shortcomings of today's ship machinery prevent future ships from attaining required performance requirements at an affordable cost. The proper architecture which exploits the advantages of advanced machinery technology must be determined now. Component developments with long lead times must start now and be governed by systems engineering discipline consistent with the over arching architecture.

(7) Restructure the current IED program from a full scale engineering development to a broader scope and more flexible advanced development effort. This restructuring will bring the IED System program in alignment with the first six points.

(8) Consider an R&D test ship. The IED System and other technology development programs could benefit greatly from an at-sea test platform to gain operational experience at an early stage of development.

(9) The industrial base and industrial processes are key to the Navy's future and to affordability. The mandates of the SECNAV/CNO "Way Ahead" Memo must be considered in all technology development decisions.

(10) Look for commonality across ship classes. The IED System development is the foundation for surface ship machinery for all future ship classes. In addition explore opportunities for commonality in machinery architecture and components with the submarine community.

3. Scope of Effort and Decision Milestones

The best way to describe the character and scope of the IED System program is through its decision milestones as illustrated in Figure 1. In this period of rapid world change, it is impossible to clearly predict the future. The Navy is in the process of developing force structure strategies consistent with the SECNAV/CNO "Way Ahead" memo. The strategy for the IED System is to be both flexible and decisive in making decisions to get on with a machinery development program for a wide range of potential ship applications. The decisions will be driven by:

(1) Requirements. The five requirements cornerstones of the IED System are: affordability, signature reduction and control, combat system support, passive protection and sustainability/energy efficiency. Performance goals have been established along with the direction to conduct total ship cost-effectiveness tradeoffs before machinery

characteristics are finalized. Yearly review and/or decision milestones are established for this continuous iterative process.

(2) Ship Applications. The IED System is required for future combatants and other ship concepts including monohull, well-deck and SWATH hull forms. The ICR gas turbine and PDSS (propulsion derived ship service) will also be considered for possible forward fit on the DDG-51 class ships. Close liaison will be maintained with the appropriate Ship Design and Ship Acquisition Managers to ensure that machinery characteristics are compatible with the widest possible range of ship applications.

(3) Flexibility and Minimum Resource Exposure. The advanced development vice full scale engineering development strategy is predicated on this point. Until ship requirements and specific ship introduction targets are established, machinery characteristics will not be finalized. Until the over arching architecture and the range of component development projects necessary to meet the requirements are determined, resource commitments will be made in phases. The first phase leads to a go/no-go decision to proceed with the development. The second phase will consist of a small scale analytical and/or physical demonstration. The third phase will proceed into an advanced development. The fourth phase will consist of full scale engineering development.

The current status and proposed decision milestones (See Figure 1) of the major components are as follows:

A. Prime Movers

1. Propulsion. This program will develop a new advanced performance gas turbine of which the Intercooled-Regenerated (ICR) gas turbine is a leading contender. Contract award is scheduled for mid 1992 for a four year advanced development program. No decision has been made relative to if and when to terminate the LM 2500. This decision, driven by consideration of whether the Navy should have both a cruise and boost propulsion gas turbine, is held until the end of 1992 after award of the ICR development contract and after further ship impact studies. Initial efforts are intended to determine target engine ratings and growth margins required for the range of anticipated future applications, opportunities for commonality with potential advanced simple cycle marine engines, and key decision issues and decision points during the overall development cycle. These studies and analyses will be conducted

by teams of in-house and contractor personnel including representatives of major engine manufacturers. The advanced development phase will be limited in scope to the minimum effort required to demonstrate and validate critical performance characteristics prior to initiation of full scale development. As such, issues such as ILS, EMI/EMC and shock qualification will be deferred to full scale development.

2. Inport/Emergency Ship Service. A decision was made that ship service power would be derived from propulsion power. This has led to a second decision not to proceed with the development of an alternative to the 501 K34 ship service generator gas turbine.

B. Propulsors

Decisions must be made relative to propulsors before the characteristics of the propulsion motors can be made.

1. Near Term Propulsor. There are three alternatives for a near term propulsor to enable a move towards the acoustic signature and efficiency goals: an open water single rotation fixed pitch propeller, an open water counter rotation fixed pitch propeller, and a ducted single rotation propulsor. A one year analytical plus reduced scale physical modeling effort will lead to a decision in mid 1992. A follow on two year development effort consisting of additional reduced scale performance and cavitation testing will be required to bring the selected concept to a state of design maturity for a near term ship acquisition project. These near term efforts are an attempt to develop cost-effective and affordable solutions to the signature reduction goals. Maximum utilization will be made of existing surface ship and submarine technology, and of existing facilities for both powering and cavitation performance measurement.

2. Far Term Propulsor. There are three alternatives for a far term propulsor: an advanced ducted propulsor, a podded forward facing counter rotation propeller, and a water jet. A three year analytical and reduced scale physical modeling effort will lead to a decision in mid 1994 to proceed into a development program. These efforts will be pursued only if satisfactory performance cannot be achieved with the near term concepts. In general, the far term propulsors involve higher degrees of complexity and risk, and include technologies which, in some cases, are yet to be proven. Utilization of the Navy's new large cavitation channel will be required to fully qualify these concepts.

C. Propulsion Transmission

A decision was made in 1986 to proceed with the development of a near term AC electric drive system. A contract was awarded to General Electric (November 1988) for the design, manufacturing and factory testing of the components. A decision to conduct system testing at a land based engineering site (LBES) at NAVSSES, Philadelphia was integral to this strategy. The electric drive system consists of three modules: motor/gear, distribution, and generator.

1. Near Term Motor/Gear. There are three alternatives for a near term motor/gear: a high speed motor (3600 rpm) with epicyclic gear, a medium speed motor (900 rpm) with epicyclic gear, and a slow speed direct drive motor. The original electric drive concept selected both the high speed and the direct drive motors. However the electric drive budget only supported the development of one machine and the decision was made to go with the high speed motor identical to the generator. (Three of these machines are included in the contract.) A one year analytical study will lead to a decision in mid 1992 whether or not to proceed with a second motor development. The gear development is not part of the existing contract; a decision will be made concurrently with decisions on propulsor and motor. In the meantime the electric drive program is proceeding with the baseline high speed motor development. The near term motor, gear, and propulsor decision should be made together. Consideration of motors with lower shaft speeds will require transition from the current solid rotor machine to machines with salient poles, and the use of aggressive approaches to minimize machine size such as complete liquid cooling and increased magnetic circuit performance. Assessment of these options will be included in the on-going contract. Additional analyses will be conducted by in-house/contractor teams. If a decision is made in 1992 to proceed with a second motor development, an appropriate contract modification will be issued.

2. Far Term Motor. Concurrent with near term system testing and validation, advanced system concepts will be explored to a limited extent to quantify the ability of these technologies to achieve the higher levels of performance which may be required to satisfy far-term goals. There are three leading candidates for a far term motor: an advanced direct drive AC motor, a direct drive permanent magnet motor, and a direct drive super conductive homopolar DC motor. Both the surface and submarine communities can benefit from the development of these concepts. A three year jointly funded analytical and reduced scale physical modeling and demonstration program will lead to a decision in

mid 1994. The far term motor and propulsor decisions should be made together. The advanced direct drive AC motor is a synchronous machine as is the near term propulsion motor, but employs unprecedented techniques to produce a very light weight and compact machine. Ability to achieve these projections as well as acoustic performance must be verified. The permanent magnet machine also offers the potential of compactness, but has, to date, only been constructed at relatively low power levels. Scalability must be demonstrated. DC homopolar machines offer the potential of exceptional acoustic performance and ease of control. However, they require superconductive field windings and the ability to carry very large armature currents. All of these concepts must be demonstrated at small-scale (e.g. 3,000 horsepower) prior to commitment to full-scale development. Applicability to a broad range of requirements is also essential to justify the large investment of resources which may be required to develop essential support technologies.

3. Distribution. The near term AC system development is proceeding. The near term and far term motor decisions could cause some minor adjustments in 1992 and possibly more extensive changes in 1994. Factors affecting such decisions are the voltages, currents and frequencies associated with the various generator and motor types, the architecture of the ship service system, and decisions to employ pulse power combat systems which would be powered from the propulsion bus.

4. Generator. The development of the near term AC generator identical to the high speed motor is proceeding. Adjustments might be made in 1992 and 1994. Any such changes in the 1992 time frame would be based upon decisions to proceed with a second motor development. It is anticipated that these would be minor and could be addressed as part of the existing contract. Far term decisions having major impact would be associated with selection of a new electric drive concept and would be addressed as part of the follow-on effort.

5. Land Based Testing. The electric drive program consists of single shaft land based testing to begin in 1993 and twin shaft testing to begin in 1994. A separate, dedicated electric drive test site is considered to be the baseline. A lower cost alternative would be an adaptation of the DDG 51 test site. A decision will be made by mid-1992 relative to the extent of the electric drive land base testing. The goal will be to ensure the adequacy of a single site to perform all component qualification testing and provide a capability for full system integration and validation. This will be accomplished in phased upgrades. In addition the benefits and possibilities of at sea testing on an R&D ship will be explored.

D. Ship Service

1. Ship Service Generation. A decision has been made to proceed with the development of a propulsion derived ship service concept. There are three alternatives: a generator driven by the propulsion gas turbine through a power take off gear, a motor/generator set powered from the propulsion bus, and a solid state conditioner powered from the propulsion bus. A one year analytical study will lead to the concept selection in mid-1992. A four year development including both factory testing and system testing at the electric drive land based engineering site will complete in mid-1996. Analytical studies will be conducted by in-house/contractor teams. Advanced development will be competitively solicited as will the full scale development follow-on. Any significant changes to system philosophy and/or approach resulting from far term electric drive decisions will be addressed as separate issues.

2. Ship Service Distribution. Shortcomings in current ship service distribution systems preclude moving towards the passive protection goals. A one year joint in-house/industry systems study of alternative distribution system architectures based on ongoing 6.2 tech base work will ensure congruence with both the electric drive and PDSS developments and will lead to a decision in mid-1992 whether or not to proceed with a reduced scale demonstration. Major thrusts in this area include: ensuring compatibility with the selected propulsion derived ship service concept; improving power quality and continuity to support combat system requirements; providing automatic reconfiguration, redundancy and separation to support passive protection goals; and ship affordability through increased modularity. Future pulse power system requirements will be addressed separately as appropriate. Reduced scale demonstration, if initiated in 1992, will include multiple contract awards with actual laboratory-scale demonstration at in-house facilities. Eventual full-scale demonstration will be at LBES.

E. Monitoring and Control. Shortcomings in current monitoring and control systems preclude moving towards both the passive protection and manning reduction goals. Monitoring and control system architecture investigations by joint in-house/industry teams have been ongoing in 6.2 tech base. A one year systems study will bring into congruence this and several other parallel efforts (fiber optics, integrated survivability management system) with the ICR, electric drive, PDSS electrical distribution development and will lead to a demonstration decision in mid- 1992. Control system specifications incorporated in the advanced development phases of individual component development projects are

limited to the extent necessary to facilitate demonstration and validation of component characteristics. The goal of this monitoring and control system effort is to integrate all of these functions into a common system and, in turn, to integrate this system with other ship control requirements. In the near term, machinery control will be integrated with damage control. In the longer term, the concept may be expanded to include combat control and ship control, as well as signature control if so required. Development and demonstration of advanced system architecture and control algorithms will be conducted at laboratory scale using combinations of digital simulation and actual reduced-scale hardware. Eventual full-scale demonstration and validation will be accomplished at LBES.

F. Auxiliaries. The current centralized production, horizontally distributed auxiliary architecture is a limitation to meeting passive protection goals. Additionally it is contrary to modular ship building practices emphasizing minimum distribution systems crossing construction boundaries. Consideration of a more dispersed auxiliary architecture must be consistent with the propulsion, electrical distribution and monitoring and control architectures as well as the Navy's long range strategy relative to modular ship building.

1. Distribution. Dispersed auxiliary distribution studies supported with 6.2 tech base funding provide the base for a one year analytical study to trade off dispersed vs centralized auxiliary architectures. A decision will be made in 1992 to proceed into a system demonstration.

2. Components. Auxiliary component development is supported in Program 603513N, Project 50382. The above distribution study and possible follow on efforts could influence the type and capacity of far term auxiliary component developments.

G. Signature Reduction and Control. OP-03's Revolution at Sea studies stipulate that signature reduction and control should receive top priority. Although goals and guidance are established, cost-effectiveness tradeoffs are required before firm, design-to requirements can be established. There are a number of special programs which are enabled by the ICR, electric drive and PDSS developments. A propulsor program is mandatory to move towards the acoustic and wake signature goals. In addition a balanced ship silencing package is required consistent with the propulsor decisions. Exhaust and IR suppression concepts consistent with the ICR gas turbine are necessary to move towards the IR goals. The

propulsion, electrical, and auxiliary distribution decisions will affect topside arrangements and thus RCS goals. An iterative systems engineering analysis will be conducted to ensure a balanced, affordable signature reduction and control strategy is pursued for all elements of the IED system.

H. Pulse Power. There are a number of ongoing technology development programs involving systems requiring large amounts of pulse power (EM gun, EM catapult, EM torpedo launcher, active armor, lasers). A one year study aimed at determining the characteristics of the pulse power requirements will lead into an analysis of options to supply this power. By mid-1994, decisions on how pulse power requirements might influence the propulsion and ship service distribution systems and what pulse power conditioning components need development will be made. Initiation of follow-on efforts as well as required adjustments to the propulsion, distribution, and control system developments will be made at that time.

It is clear that there are many inter-related decisions which must be made over the next four years. A strong multidisciplinary systems engineering team will be required. A close dialogue with the program sponsor and the ship design and ship acquisition programs is mandatory.

4. Systems Analysis and Systems Engineering

This program recognizes that the key to success is sound systems analysis and systems engineering.

In 1975, the USS Spruance (DD 963) was placed in service heralding the introduction of modern gas turbine machinery into the US Navy. Five additional classes of US Navy ships have incorporated evolutionary improvements to the Spruance machinery plant: Kidd (DDG993), Perry (FFG 7), Ticonderoga (CG 47), Burke (DDG 51), and AOE 6. The next new class of gas turbine powered ships will probably not enter the fleet before the year 2000 (25 years after Spruance).

All five classes of gas turbine ships in the US Navy have machinery plants with:

- LM 2500 simple cycle propulsion gas turbine engines
- Mechanical propulsion transmission
- Controllable, reversible pitch propellers (except AOE 6 which has fixed pitch propellers and a reversing reduction gear)
- Non integrated propulsion and ship service electrical distribution

- Centralized auxiliary machinery
- Centralized machinery control.

Section 3 of this plan outlines the alternative system concept proposed for the IED System.

The fundamental question which must be answered with clarity is: Acknowledging that there are shortcomings with the current machinery system concept, is it cost effective to develop and introduce into the fleet a new machinery system?

Over the past four years, considerable systems analysis has been conducted as part of OP-03's Revolution at Sea studies to determine the force structure, the operational characteristics, and the system concepts and technologies for the surface navy. The need for an improved machinery system has emerged as a clear imperative.

The Navy recognizes that certain assumptions which served as the basis for recent systems analysis studies have been overcome by the events in the communist world as well as in the third world. A continuing systems analysis effort is required.

This program plan for the Integrated Electric Drive system includes a focused systems engineering and systems analysis effort in collaboration with and building upon other ongoing Navy studies. The objectives are:

- Affordability. Establish affordability requirements for specific ships. Determine the potential of the IED System to reduce fleet and ship acquisition and operating and support costs.

- Signature Reduction and Control. Determine the military effectiveness payoff and cost of improving multi-spectral signatures. Establish signature reduction requirements for specific ships. Determine the contribution of the IED System to meeting these requirements.

- Combat System Support. Determine the military effectiveness payoff and cost of alternative combat systems concepts including those with high pulse power demands. Establish requirements for specific classes of ships. Determine the contribution of the IED system in supporting these combat systems to ensure a balanced, cost effective total system.

- Passive Protection. Determine the military effectiveness payoff and cost of improving passive protection features enabling future ships to fight hurt. Establish passive protection requirements for specific ships. Determine the contribution of the IED System to meeting these requirements.

- Sustainability/Energy Efficiency. Determine the military payoff and cost of improving fleet sustainability and energy efficiency. Establish requirements for specific ships. Determine the contribution of the IED System to meeting these requirements.

The systems engineering and systems analysis approach of the IED Program will stress:

- Building on sound ongoing systems analysis work being conducted within the Navy. The strongest ties will be to OP-03's Revolution at Sea studies! It is beyond the scope of this program to determine the operational performance and affordability requirements on a fleet and ship level. It is the responsibility of this program to translate these top level fleet and ship requirements into performance and cost requirements for the IED System.

- Utilizing approved, certified scenarios and military effectiveness and cost assessment models. Additional effort will be required to sensitize these models to certain IED System parameters.

- Integrating systems analysis and systems engineering as it relates to the IED System. The systems analysis effort focuses on establishing the operational need and describing the operational performance and cost requirements for the IED System. The systems engineering effort focuses on determining the preferred systems architecture, determining the characteristics of all components, and establishing the "design to" performance, cost, and technical requirements for the system and all components.

- Iterating the findings and providing a yearly report to summarize both the systems analysis and systems engineering efforts and document the major decisions as outlined in Figure 1.

This program recognizes that the key to success is sound systems analysis and systems engineering. It is now and will continue to be the hallmark of the IED System Program.

5. Deliverables and Program Schedule

The major program deliverables by year include:

FY 91 -
- IED System Program Plan
- ICR Request for Proposal
- Electric Drive contract mod for propulsion motor and systems studies
- Systems Analysis/Systems engineering tradeoff report

FY 92 -
- Near term propulsor report
- PDSS concept report
- Ship service distribution, monitoring and control, and auxiliary distribution reports
- Pulse power requirements report
- ICR contract award
- PDSS contract award
- Far term motor analysis and demo contract awards
- Systems Analysis/Systems engineering tradeoff report

FY 93 -
- Near term propulsor design and development report
- Complete factory test of first electric drive shaft set. Report results
- Deliver equipment to LBES.
- Cost-effectiveness report
- Systems Analysis/Systems engineering tradeoff report

FY 94 -
- Far term propulsor report
- Far term motor analysis and demo reports
- Ship service distribution and machinery monitoring and control demonstration reports
- Systems Analysis/Systems engineering tradeoff report

FY 95 -
- Begin ICR performance demonstration. Report results.
- Complete factory test of second electric drive shaft set. Deliver equipment to LBES. Report results
- R&D Test Ship report
- Systems Analysis/Systems engineering tradeoff report

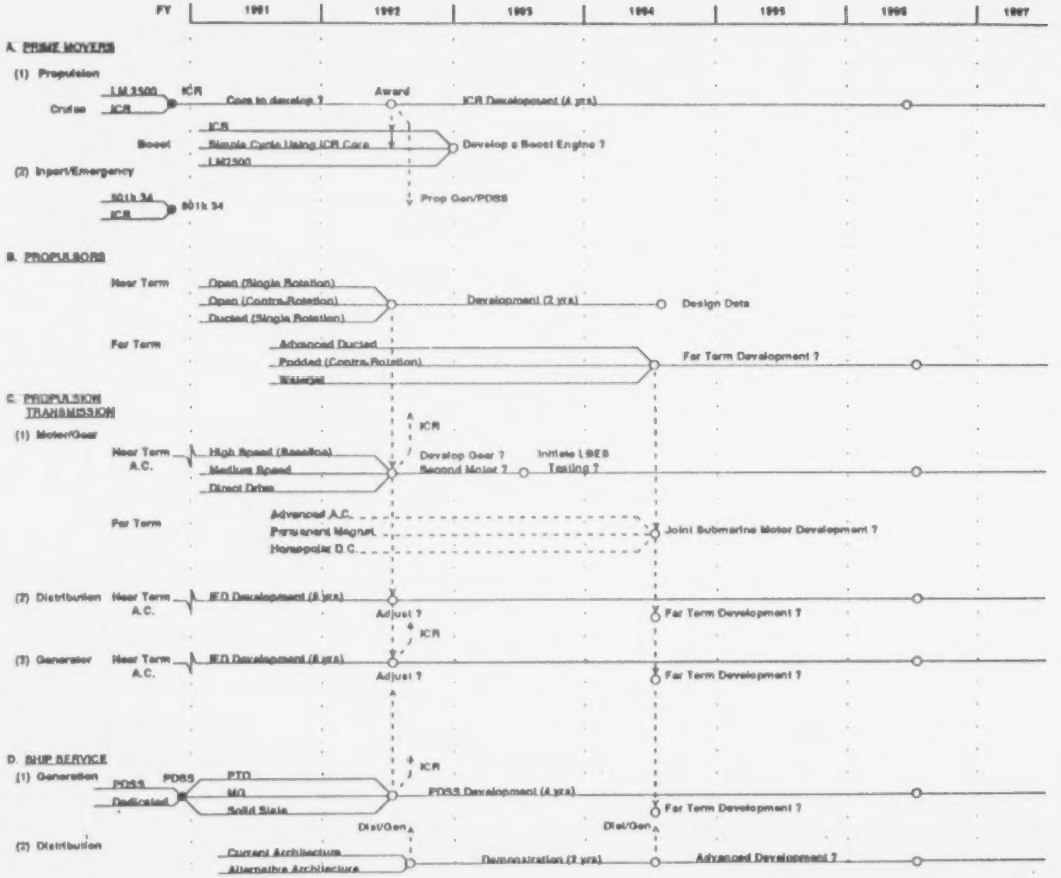
FY 96 - Complete electric drive LBES test. Report results
Complete PDSS LBES test. Report results
Complete ICR performance demonstration. Report results
Complete ship service distribution and monitoring and control tests. Report results
Systems Analysis/Systems engineering tradeoff report

The master program schedule showing the inter-relationships among these developments is provided in Figure 2.

6. Funding

The funding for each of the major tasks is provided in Table 1. The electric drive line includes funding for the baseline near term electric drive work plus the alternative motor investigation and the PDSS development. The funding through 1997 provides for a balanced, orderly development for all elements of the IED system. The restructured program reduces the overall budget by 20% as compared to the previously proposed electric drive program.

Figure 1. MACHINERY DECISION POINTS



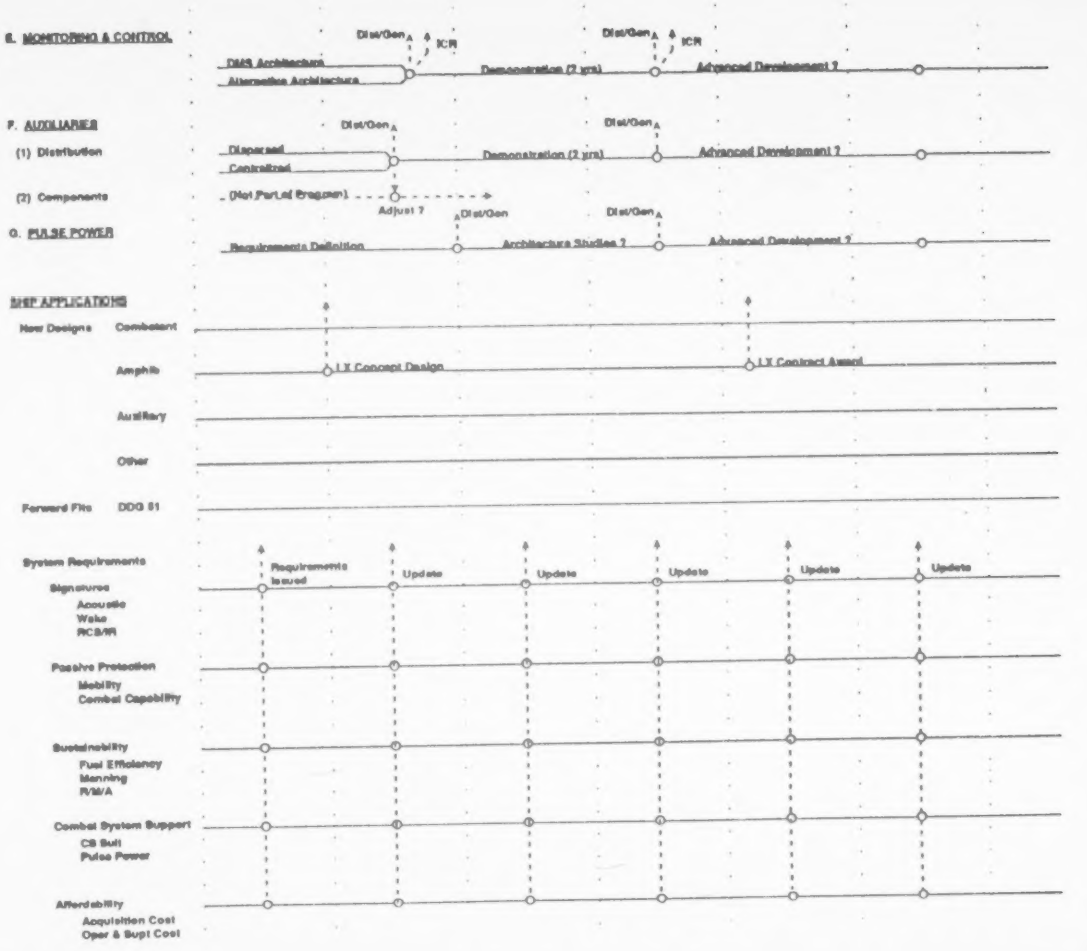

E. MONITORING & CONTROL
Dist/Gen
ICR
Dist/Gen
ICR
DMS Architecture
Alternative Architecture
Demonstration (2 yrs)
Advanced Development ?
F. AUXILIARIES
(1) Distribution
Dist/Gen
Dist/Gen
Dispersed
Centralized
Demonstration (2 yrs)
Advanced Development ?
(2) Components
(Hot Partial Bypass)
Adjust ?
Dist/Gen
Dist/Gen
G. PULSE POWER
Requirements Definition
Architecture Studies ?
Advanced Development ?
SHIP APPLICATIONS
New Designs
Combatant
Amphib
LX Concept Design
LX Contract Award
Auxiliary
Other
Forward Fits
DDG 51
System Requirements
Requirements Issued
Update
Update
Update
Update
Update
Signatures
Acoustic
Wake
RCS/IR
Passive Protection
Mobility
Combat Capability
Sustainability
Fuel Efficiency
Manning
R/M/A
Combat System Support
CS Suit
Pulse Power
Affordability
Acquisition Cost
Oper & Supt Cost

Figure 2
MASTER PROGRAM SCHEDULE

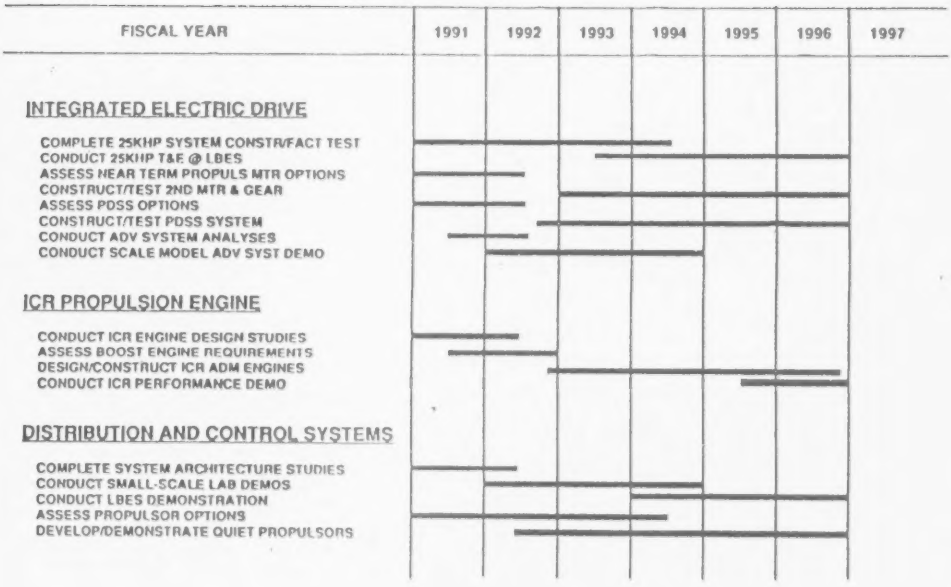


Table 1

IED SYSTEM BUDGET SUMMARY ($M)

FY	91	92	93	94	95	96	97	TOTAL
TOTAL	53.5	80.9	130.0	135.5	110.8	102.2	45.4	658.3

Senator KENNEDY. How would you respond to the charge leveled by some that the system is "nice to have" for Navy laboratories but not "have to have" for the fleet?

Admiral KELSO. We are continuing—I think you know, Senator—to look at the motor technology and we have a contract working. We certainly believe that the improvements for the gas turbine have applications that we could use now.

Certainly, integrated electric drive would give us a more survivable platform and it would give you more flexibility in power distribution on a ship. It probably will not give you much improvement in weight or efficiency—a little bit.

We think that before you could use it in a ship, you will have to design a ship for it. You just cannot fit it into another ship. Our view is that we ought to continue the research and development, and particularly to the step beyond this, where you might get to a very small, and much lighter, electric drive platform.

I think we should continue the research and development at a rate so we know what could be done in the future.

Senator KENNEDY. Just on the earlier point that I was talking about with regard to the carrier battle group and the changed strategy and the types of ships we should be procuring, it would seem to me that in some cases—talking about the carrier group—the demands may be more severe. For example, the air defense problem may be more acute if we are operating closer to shore. There may be less warning time.

Admiral KELSO. Yes, sir.

Senator KENNEDY. The demands may be somewhat less severe in other ways. In the air defense example, we would probably not be faced with a Third World raid with large volumes of anti-ship missile in a heavy jamming environment.

It is these kinds of technology changes. I mean, perhaps a greater threat would be found in terms of operating offshore, perhaps less jamming—maybe not. Maybe these Third World countries are developing, increasingly, the capability for jamming. I do not have that kind of information available.

I, for one, am interested in seeing that the Department is thinking about these matters and considering them and making judgments and decisions based upon the best information that is available with some of those changed circumstances. In that way, we build the kind of credibility for the kinds of things that you are really going to need to do the job, and there are many of us who want to make sure you have the resources to be able to do it.

Identifying and demonstrating the evaluations of these different kinds of technologies and circumstances adds a credibility in terms of your own budget and future needs. That is a personal observation, but it is based on at least some experience here in the committee.

Obviously, Admiral Kelso, and you, Secretary Garrett, have given many of these a good deal of thought. I think being able to better acquaint ourselves with that kind of review that is taking place is our responsibility. I think it is important in terms of our subcommittee, the full committee and the Nation as a whole, to have a pretty good grasp of the depth of the thought that you are giving and the complexities, and the hard choices that some are being made.

As I said, the greatest concern I have is that we are still trying to do everything across the board at the present time with scarce resources and spreading this very, very thin.

If the time comes down the road, when there are going to be future leaders, their opportunity and options to really bring focused and enhanced attention and resources in areas are going to be much more limited, and that is why I think your responsibilities are so particularly important at this time—in many respects perhaps equally important, if not more important, than at a time when we had an adversary that was in a more potentially aggressive mood.

I appreciate very much your response to these questions. If others have additional questions, we will submit them.

Thank you very much. The committee stands in recess.

Mr. GARRETT. Thank you, Senator.

Admiral KELSO. Thank you, Mr. Chairman.

[Whereupon, at 11:25 a.m., the subcommittee was adjourned.]

45-847 (224)